SINCLAIR
QL
WORLD

Every month £1.25 February 1988
DENMARK DKR 40.00
GERMANY DM 9.00
NETHERLANDS DFL 9.25
SWITZERLAND SFR 6.50

ELECTRIC SECRETS

Inside the QL — microdrives, regulators and interfaces

Microbridge — The QL shows its hand

Imagine a new adventure

Super Basic: linear lists

DIY Toolkit: file headers

Introducing QTALK

TEXT TO SPEECH IN A FLASH

PRICE	
Qtalk	£75.00
VAT	£11.25
Post/Packaging	£ 2.25
Total	£88.50

Qtalk Applications

1) **Health**
   - a viable solution to speech impairment/impediment
   - allows the blind to write documents and programs
2) **Education**
   - an excellent tool for teaching the relationship between the written and the spoken word
   - a valuable aid to those assisting the dyslexic or for students with reading problems
   - an amazing new method for teaching or learning the translation of one language to another
   - touch typing made easy with keyboard echo
3) **Industry**
   - enables verbal output of readings/warnings from independent peripherals. (BUS, IEEE, RS232 etc)
   - can be used to give instructions to an operator
   - could be set up as an answerphone or entryphone
4) **Entertainment**
   - allows the user to verbally list programs while checking them against a hardcopy listing
   - can be made to hum musical tunes
   - provides a whole new dimension to computer games

Hardware Features

RS232C, Selectable baud rate, DCE or DTE
- will operate on any computer with an RS232 port
- at any standard baud rate
- does not tie up the expansion port

Three adjustable presets:
- allows adjustment of Volume, Pitch and Pitch range (16 levels)

Black Eurocard enclosure, QL plug, power lead, socket and serial cable
- simply plugs in between your power supply and QL
- maintains the integrity of your computer system

(Note. CST Thor version is powered through the serial lead)

Software Features

Full 68000 Text To Speech software incorporating 16 levels of pitch.
- lightning fast conversion of any string into speech
- any multi syllable word may be split, with different syllables spoken at differing levels of pitch, allowing intonation
- 20K of code. Will work on standard (128K) machine and Thor

Built in Exception Table (BET)
- certain words defy all logic and no amount of rules can cater for these. Therefore, their pronounciation has been permanently set in an exception table. eg 'thorough', 'ghoti', 'Lbytes', 'flp1'

Size selectable User Exception Table (UET)
- Users can set up their own table of any size and fill it with their own words/pronounciations. This overrides words in the built in table therefore allowing translation of languages. This table can be saved and reloaded for later use.

Over 400 rules to convert text to speech.
- If the word or string is not found in either table it will be pronounced via a sophisticated set of rules.

Full Device driver implementation.
- a new device called 'QTK' is added to the QL's list of devices. This means that you can use all of the built in basic keywords to send information to QTALK. eg PRINT, LIST, DIR, COPY etc. and also use QTALK with other computer languages (PASCAL, FORTRAN etc)
- a set of clever superbasic extensions is also included to make QTALK a breeze to use
- may be set to pronounce or ignore punctuation

Multitasking screen editor
- can be called up any time to set up and add, alter or delete words from the User exception table. Comprehensive on screen help.
- Hopefully the last word in QL clocks — talking time and date

Many more thoroughly documented features

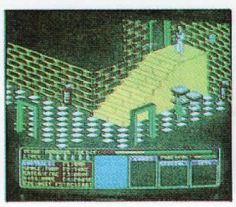
ALIEN HIJACK

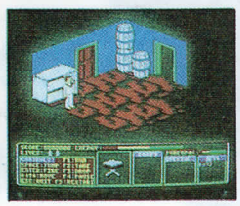
The year is 2003 and you are working on the S.P.C. Forward, as ship's engineer. On the 23rd day you are attacked by an alien space ship and all hell breaks loose. You must regain control of your ship, against some mighty tough opposition.

The first TALKING game for the Sinclair QL. Possibly the most amazing QL graphics seen to date

- 3D graphics
- Full 68000 code
- 192 colour screens
- fast, dynamic, challenging
- talking hero and aliens

Note. Alien Hijack does not require QTALK to run but it certainly makes it a lot more fun. Works on a 128K QL.





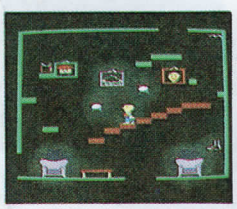
PRICE	
Alien Hijack	£15.00
VAT	£ 2.25
Post/Packaging	£ 1.00
Total	£18.25

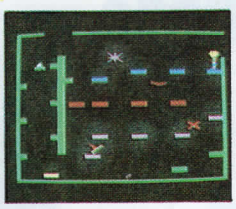
PUZZLE MANIA

Your mission, should you decide to accept, is to journey about the danger ridden cells of Maniaville to retrieve the lost loot of Lawless Lenny. Several obstacles will attempt to thwart your progress and only the smartest gamer will survive.

The second TALKING game for the Sinclair QL
- full 68000 code — 40 colour screens — fast, arcade action
- spoken clues to help you win (if you are good enough)
- Truly addictive challenge

Note. Puzzle Mania can operate without QTALK but is much more fun with it.





PRICE	
Puzzle Mania	£10.00
VAT	£ 1.50
Post/Packaging	£ 1.00
Total	£12.50

Special Introductory Offer

Buy QTALK, PUZZLE MANIA and ALIEN HIJACK and receive £5.00 discount pre VAT total

SQLW 2

Name _____

Address _____

Please rush me _____

for my **QL/THOR** (cross out one which does not apply)
with software on 3½" **disc/mdv** (cross out one which does not apply)

I enclose a **bank cheque** for £ _____
or please debit my **Access/Visa card** (cross out one which does not apply)

Card number |_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|

Expiry date _____ **Signature** _____

I appreciate that no funds will be deposited until despatch of goods. Please allow up to 21 days for delivery (airmail).

Maxtronics R&D Ltd

(New Zealand)

ORDERS TO:

CHI – SOFT: 20 Chandos Way, Wellgarth Road, Hampstead, London NW11 7HF, Great Britain. Telephone (01) 458-7249

or

Maxtronics R&D Ltd: 26A Conway Street, Christchurch 2, New Zealand. Telephone (64-3) 325-546

SINCLAIR QL WORLD

Editor
Helen Armstrong
Sub Editor
Harold Mayes MBE
Production Manager
Nick Fry
Designer
Chris Winch
Art Editor
Neil Tookey
Advertisement Manager
Perry Trevers
Assistant Advertisement Manager
Jonathon Manning
Magazine Services
Sheila Baker
Advertising Production
Serena Hadley
James Pyle
Managing Editor
Brendon Gore
Publisher
Trish Phillips
Group Publisher
Paul Coster
Financial Director
Brendan McGrath
Chief Executive
Richard Hease
Microdrive Exchange 089 283 4783/2952 (2 lines) TIL

Sinclair QL World
Greencoat House
Francis Street
London SW1P 1DG
Telephone 01-834 1717
Fax 01-828 0270
Telex 9419564 FOCUS G
ISSN 026806X

Unfortunately, we are no longer able to answer enquiries made by telephone. If you have any comments or difficulties, please write to The Editor, Open Channel, Trouble Shooter, or Psion Solutions. We will do our best to deal with your problem in the magazine, though we cannot guarantee individual replies.

Back issues are available from the publisher price £2 U.K., £2.75 Europe. Overseas rates on request. Please telephone 089 283 4783 to check availability.

Published by Focus Magazines Ltd., London

Distributed by Quadrant Publishing Services, Sutton.

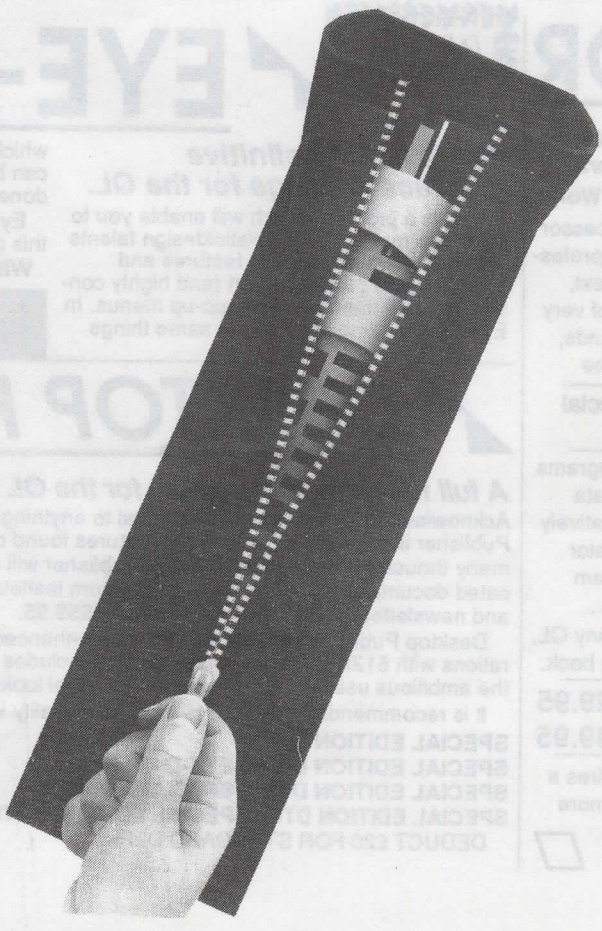
Subscription information from: TIL, PO Box 74, Paddock Wood, Tonbridge, Kent TN12 6DW.
£15 U.K. £30 Surface mail Europe and the rest of the world. Add £5 for air mail + £10 overseas.

Typesetting by LSG Graphics, Gainsborough. Tel. (0427) 5323.
Printing by LSG Print Division, Lincoln. Tel. (0522) 513030.
©COPYRIGHT SINCLAIR QL WORLD — 1988

CONTENTS

FEBRUARY 1988

7 QL SCENE ● Digital Precision burgeons
10 OPEN CHANNEL ● Witherows rise in force
16 SOFTWARE FILE ● New generation adventure
20 SUPERBASIC ● Linear lists
29 A BRIDGE GOES FAR ● The Microbridge report
35 INSIDE THE QL ● Preventative medicine
44 DIY TOOLKIT ● Head-it edits — plus EDLINE$
50 FOCUS SALES POINT ● QL shoppers' paradise
52 MICRODRIVE EXCHANGE ● Pruned to perfection



NEXT MONTH

THE EDITOR
Digital Precision's The Editor is appearing in a new incarnation — more wordprocessor-like than before. Ron Massey reassesses it.

THE PROGS
Back after a month's holiday — QL World's regular aerobics session for fingers.

OUT OF THE SHELL
Another victim of the Christmas post, Compware's Expert System Shell has landed and awaits inspection by Marcus Jeffrey.

TURBO V2.0

Turbo V2.0 is the very latest version of Digital Precision's acknowledged world-beating compiler. SuperBasic programs compiled with Turbo can run 100 times faster! Ever since its release just over a year ago Turbo has astounded the pundits and amazed its users not just by its speed, but by its incredible flexibility and, in combination with the Turbo Toolkit, its vast array of powerful commands.

Turbo v2.0 has a totally reworked front-end user interface, allowing a huge number of compile options and - amazingly - a setting for how good a programmer you are! User configurable in advance and at runtime. Helpful error messages supplement the 350 page user encyclopaedia. Features smart auto-correction - Turbo is tolerant!

Turbo Toolkit now provides 200 additional commands, procedures and functions to increase the power of Superbasic, nearly all of which are available under the interpreter and Turbo. Turbo Toolkit is RAM-based and can be used as a stand alone utility or to complement existing toolkits such as Supertoolkit - it costs £29.95 by itself.

D·P Classic

Turbo V2.0 system including Turbo Toolkit £99.95.

Upgrade Supercharge to Turbo for £65 - return mdv, manual and lenslok .

DIGITAL PRECISION

222 The Avenue
Chingford
London
E4 9SE
Telephone 01-527 5493

3D PRECISION

NEW!

At last, a 3D modelling and CAD graphics package that truly does justice to the QL's potential.

3D CAD on the QL has always been either too slow or too crude to be of any practical value - until 3D Precision. 3D Precision is a full featured, menu driven 3D designer and toolkit which enables you to easily produce professional looking 3D designs and drawings: there is no requirement for uniform cross sections and no restrictions on minimum step size.

3D PRECISION permits continuous, pre-programmed and co-ordinate based drawing with pan, scroll and rotate about any axis, all at astounding speed. Functions include recolour, rescale, recentre, zoom, edit, stretch and reposition. Perspective is continuously adjustable by zooming, translation and rotation of the 'camera'. Fully rubber banded autogeometrics are provided.

3D PRECISION comes with an easy to use toolkit which adds 100+ commands to SuperBasic and machine code. It's fast enough for animation, and gives you all the effects and controls you've dreamed of.

3D PRECISION provides advanced users with facilities for artistic/technical modelling, conceptualisation and manipulation in 3D.

3D Precision complete with toolkit and manual — only £49.95

THE EDITOR

"Superb...it exceeds feature specifications found even in the best word processors"

Sinclair QL World.

D·P Classic

At last a word processor for the QL with truly professional facilities. The Editor is a word, text, character and file processing system of very superior capabilities. With 200 commands, very high speed and great flexibility, The Editor handles text files, Quill files, programs in SuperBasic and other languages, data files, screens, object files etc. Editor natively multitasks. A comprehensive configurator gives you total control over fonts, system defaults, colours, cursor speed, sizes...

Existing users - upgrade to Special Edition Editor for only £25

The Editor V1.17, which works on any QL, comes with a comprehensive 90 page book.

EDITOR V1.17	**£29.95**
SPECIAL EDITOR	**£49.95**

The Special Edition Editor V2.05 requires a minimum 128K extra RAM, has 40% more commands and a new 160 page manual. It's the last word.

EYE-Q

Eye-Q is the definitive graphics package for the QL.

Eye-Q is a program which will enable you to make the most of your artistic/design talents via an unequalled array of features and "drawing aids", an intelligent (and highly consistent) user interface with pop-up menus. In Eye-Q, the same keys do the same things whichever option is selected: anything that can be done to the whole screen can be done to any part of it.

Eye-Q is 100% handwritten machine code: this gives it unsurpassed smoothness.

With fully comprehensive A4 manual.

£29.95

DESKTOP PUBLISHER

A full function DTP system for the QL with 256K RAM expansion.

Acknowledged by the press to be equal to anything available on a home micro, Desktop Publisher incorporates many of the features found on professional DTP systems costing many thousands of pounds. Desktop Publisher will give you the power to produce sophisticated documents; it will tackle anything from leaflets and posters to brochures, catalogues and newsletters. Desktop Publisher costs £59.95.

Desktop Publisher Special Edition is an enhanced, more powerful version for QL configurations with 512K RAM and a disk drive. It includes many enhancements which will enable the ambitious user to create more professional looking documents more easily..

It is recommended that DTP is used with quality WP and graphics software.

SPECIAL EDITION DTP	**£79.95**
SPECIAL EDITION DTP & EYE-Q	**£104.95**
SPECIAL EDITION DTP & SPECIAL EDITOR	**£114.95**
SPECIAL EDITION DTP, SPECIAL EDITOR & EYE-Q	**£139.95**

DEDUCT £20 FOR STANDARD DTP

D·P Classic

MICROBRIDGE

Microbridge is a superb contract bridge bidding and playing program which can also teach bidding in a series of sixteen lessons used in conjunction with a brilliant manual.

The tutor is followed up with a virtually unlimited set of hands for further practice in bidding and play. Lots of fun.

Microbridge is one of the strongest bridge programs available for any computer. It understands many of the subtle elements of card play and never cheats by peeping at hidden hands. This makes it a challenge for skilled players as well as a non-abusive instructress for beginners. Microbridge's fluent commentary is a first in computing.

Microbridge requires memory expansion and disk drives and costs £34.95

SUPER SPRITE GENERATOR

The ultimate tool for the creation of high quaility high speed sprites, whether for fast action/adventure games or serious applications. Now the truly professional tricks of the top games programmers can be recreated with no machine code knowledge required on your part.

- 100% flicker free
- real time collision detection
- comprehensive diagnostics with error trapping
- Up to 256 multicoloured sprites and planes
- 16 frame animation

"The results that can be achieved are simply excellent" is what QL User said way back in 1985. Now with many more new enhancements.

£29.95 complete

SUPER MEDIA MANAGER

Frustration with corrupted data? Never want the experience? SMM provides everything you are ever likely to need in one integrated menu-driven package - and it's not just for whan things go wrong.

- Copy any (yes, ANY) disk or cartridge
- Sector loading, copying and editing.
- Auto file recovery ● Directory sort
- String searching ● Hardware diagnostics
- Direct file copying from other disk for mats i.e. PC-DOS, MS-DOS, CP/M etc.
- Text file translation utility.

"The definitive blockbuster... Includes every possible facility"

ONLY £39.95 Cartridge only version £24.95

SUCCESS - The Supreme CP/M Code Emulation System

NEW!

☐ CP/M is the most widely implemented operating system. Famous programs like Wordstar, Supercalc, Symphony, Lotus 1-2-3, dBase and Perfect Writer, and a huge library of public domain software, is available to run under CP/M.

☐ QL owners can break into this program bank using Success. Success stands for Supreme CP/M Code Emulation System. No knowledge of CP/M is required. A disk drive is necessary only for the original program transfer.

☐ Success is much more than just a CP/M emulator. It has full QDOS file handling, ED line editor, 8080 assembler, PIP copier, creation of executable CP/M and all the CP/M utilities. What distinguishes Success is its absolutely phenomenal speed.

☐ Success is designed for beginners, but the manual also contains detailed guidance for those who want to access CP/M and QDOS at machine code level. The extensive manual contains full details of where you can get cheap CP/M programs. Open up your QL to the enormous potential of CP/M **NOW.**

Nothing succeeds like Success - only £49.95

PROFESSIONAL ASTROLOGER

The most advanced, accurate and extensive astrology package yet produced for any home micro. Professional Astrologer is suitable for those with advanced astrological knowledge, but can be used equally well by curious amateurs.

The program offers the most complete readout possible including ten pages of personality/character delineation, six pages of day-to -day and year-to year personalised text predictions and three pages of 'synastric' text comparisons between two people. These are just some of the astrological features offered:

● Transits ● Progressions ● Seven house systems ● Individually adjustable orbs ● 158 birth data files ● Eclipses ● Closing aspect indicator

Professional Astrologer can be supplied with its complementary program; Professional Astronomer. This program features a full planetarium display, automatic parallax correction, planet faces and solar system display in parallel projection. Astronomer on its own costs £29.95.

"One of a kind...every requirement provided for...descriptions like superb, ultimate, excellent are hardly adequate" QL World

Professional Astrologer £59.95
With Astronomer £69.95

DIGITAL C

NEW!

C is the best language. Digital C is both the best and the fastest C compiler available for the QL. Highly transportable: exceeds the Small C specification. The QDOS library gives the most complete degree of QL compatibility.

Digital C generates machine independent, compact, stand-alone, multitasking executable machine code. The supplied library manager and generator allows integration of C functions into library modules for later use. Ideal for a beginner, sufficiently sophisticated and advanced for a pro.

Complete with suoer manual
£39.95

BETTER BASIC £24.95

Just that - a program that will improve all your programs. Analyses, corrects, and annotates Superbasic Programs. The program is totally user configurable and very easy to use.

"Excellent, a five star program". **Sinclair User**

SUPERFORTH V2.0 £39.95

The full multitasking, stand-alone, high speed Forth 83 system is supplied with an extremely powerful compiled Othello (which beat the 1983 World champion). Now with extended 100 page manual and full string handling. Fully compatible with 68000 code and QDOS.

ULTRAPRINT £19.95

Soup up your Epson/Oki compatible printer. 22 different type sizes and styles, giving you control over all aspects of text and graphic output. Easy to use, fast, multitasking and fully compatible with Eye-Q. Supplied with manual written for idiots.

GAMES

BLOCKLANDS - fast addictive maze game with super-smooth multi-directional scrolling.£9.95.
DROIDZONE - The all time classic space shoot 'em up - astounding speeds. £9.95.
SUPER ARCADIA - Two games for the price of one! BMX burner is a 64 screen arcade adventure, + Grid Racer for only £9.95.
SUPER REVERSI - the strongest version of the classic board game around. £9.95.
SUPER BACKGAMMON - fast response, clocks, 3 play modes. Complete with rules. £12.95.

Any 3 for £24, any 4 for £30, all five for £36!

DISKS FOR CARTRIDGES

Send us your working new/used microcartridges and we will send you brand new **blank** disks. One 5.25" for 2 cartridges; one 3.5" for 4. Minimum quantity 16 cartridges: no fractions!

RESS..STOP PRESS..STOP

Need guidance? Call/write for our new REVIEW DIGEST: a collection of independent critical press reviews. 52 page product brochure also available. Both free. Both different.

Coming soon. Accounting and office automation suite for small/medium businesses, with turnovers from £10 to £100,000,000. POLYMATH - full math/stats compendium: all the procs you never wanted to write, but needed to use.

Inside QDOS. The full 260 page ROM dis. Send your QL's serial no. and £29.95, quick.

Transfer utility. This will convert any unprotected cartridge program so that it runs from disk: you need Tebby's toolkit (almost certainly in your disk interface ROM) to run this. Cost £10.

Hardware. Interfaces from £70, RAM expansions from £50, interface plus RAM from £110, 3.5" DSDD drive from £125. Write for details

To: Digital Precision, 222 The Avenue, London E4 9SE or Telephone 01-527 5493

Please send me .....

.....

.....

I enclose ☐ cheque ☐ cash ☐ P.O.
☐ Access/Mastercard
☐ Visa/Barclaycard

for (amount) £..... card No .....Expires.....

Name .....
Address .....
.....
.....
.....
Postcode.....

Do you have ☐ 3.5" disks ☐ 5.25" disks ☐ Microdrives only
If you have disks, do you get ☐ 720 sectors ☐ 1440 sectors

COMPUTERS

QL JS 2.3 software	£169
QL640K JS 2.35 s/ware	£260
Psion 2.3 sets	£10
Psion 2.35 sets	£23
(inc 2.38 Archive)	

PSION ORGANISER

Organiser XP 32K	£138
128K Datapak	£100
32K D Rampack	£55
Harvester Superchip	£99
Data Organiser	£35

Z 88

Z88 + mains adaptor	£297.50
32K Rampack	£20.00
128K Rampack	£50.00
QL - Z88 link	£23.00
Centronics interface	£30.00

TK COMPUTERWARE

the QL stockist

Tel: 0303-81-2801

DISC SYSTEMS

Dual 3.5 in. + Trump Card	£350.00
Single D/D 3.5in. drive	£125.00
Single D/D 3.5 in. & 0K SQB	£225.00
Dual D/D 3.5 in drive	£209.00
Dual D/D 3.5 in. & i/face	£295.00
Dual 3.5 in. & 512K SQB	£350.00
Cumana disc interface	£ 86.25
768K Trump Card	£199.00

SPARES

JS ROM sets	£27.50
Keyboard membrane	£6.25
Keyboard bubble mat	£3.85
ULA ZX 8301	£9.50
ULA ZX 8302	£10.25
MAB 8049	£7.50
CPU 68008	£25.80
M/drive assemblies- complete	£27.50
Voltage regulator (high output)	£4.75
Power supply UK	£23.50
Power supply European	£25.50
QL Test kit	£13.50

SUNDRIES

10 Microdrive cartridges	£17.50
Cartridge storage box	£5.50
QL Dustcover	£5.00
100 Microdrive labels	£3.75
Powerclean filter	£36.00
Eprom Programmer	£129.00
Battery clock kits	£19.50
10 DS/DD discs 3.5" (u/b)	£18.50
Joystick + adaptor	£16.00
512K internal U/G	£94.00
Centronics Interface	£19.50

SOFTWARE

BUSINESS

Flashback (c-d)	£25.00
Cash Trader (PDQL)	£80.00
Cash Trader + Analyser	£105.00
Decision Maker	£35.00
Entrepreneur	£35.00
Finance Manager	£19.00
Home Finance (Buzz)	£22.00
Investment Monitor	£20.00
Project Planner	£29.00
Small Traders Pack	£25.00
Spellbound (c-d)	£30.00
Spellbound + Filebound	£35.00
Touch Typist	£12.00
Pacioli	£25.00

UTILITIES

Archivist	£30.00
Cartridge Doctor	£13.00
Copymate	£11.00
CPM Emulator (c-d)	£45.00
Assembly Lang. Toolkit	£25.00
Desktop Publisher	£60.00
Desktop Publisher - S/Edition (d)	£80.00
Front Page (c-d)	£23.00
Front Page Extra 2 (c-d)	£40.00
ArchRTM	£20.00
ICE Eprom	£27.00
ICE Drawing Office	£15.00
Key Define	£10.00
Locksmith	£11.50
Mailfile (256K)	£20.00
PCB Designer 1	£99.00
QFLASH Ramdisk + toolkit	£19.00
QFLASH Ram Eprom	£25.00
QFLASH Ram utilities (c-d)	£10.00
Reconfigurable toolkit 2	£29.00
4 Matter	£11.50
Recover	£20.00
Sideways	£20.00
Sidewinder	£12.00
Archive Tutor	£21.00
Super Media Manager (d)	£40.00
XRef	£15.00
Compare	£10.00
Super Toolkit 2 (Eprom)	£29.00
QIMI + Giga Mouse	£70.00
QLiberator (c-d)	£60.00
QLiberator (budget)	£30.00
QLoad & Ref	£10.00
Quats	£25.00
QRam (c-d)	£30.00
QWriter 2	£20.00
Task Master (c-d)	£25.00
Speed Screen	£20.00
The Editor	£29.00
The Editor - special edition	£49.00
Turbo (c-d)	£99.00
Turbo Quill (c-d)	£10.00
Turbo Quill + (c-d)	£13.00
Ultra Print	£20.00

CAD

Concept 3D	£40.00
Eye Q	£29.00
Mandelbrot Magic	£15.00
Sign Designer	£17.00
TechniQL	£50.00
The Designer	£15.00
Viewpoint	£20.00
3-D Designer	£35.00

LANGUAGES

Assembler Workbench	£25.00
Basic-Ally	£20.00
Better Basic	£24.00
BCPL Development Kit	£51.00
C Compiler	£85.00
DevPac Development Kit	£30.00
LISP	£51.00
Macro Assembler	£38.00
MonQL (Eprom)	£30.00
Pascal (Computer One)	£40.00
Pascal (Metacomco)	£75.00
Pro Fortran-77	£92.00
Pro Pascal	£92.00
QMON	£20.00
Super Forth + Reversi	£39.00

LEISURE

Area Radar Controller	£13.00
Chess	£17.00
Cosmos	£14.00
Flight Simulator	£19.00
Matchpoint	£14.00
Bridge Player 2	£20.00
Professional Astrologer	£70.00
Super Astrologer	£25.00
Scrabble	£15.00
Snooker	£13.00
Squadron	£16.00
Super Backgammon 3	£13.00
Strip Poker	£15.00
Type 22	£18.00
War In The East:	
1 Barbarossa	£19.50
2 Stalingrad	£13.50
3 Destr. of Army Group	£13.50
War in the East (set)	£39.95

ADVENTURE (text)

Heart of Gern	£15.50
Horrorday	£15.00

ARCADE

Aquanaught 471	£20.00
Blocklands	£10.00
Archanoid	£15.00
Death Strike	£15.00
Fictionary	£11.50
Hoverzone	£15.00
Hyperdrive	£13.00
Jungle Eddi	£15.00
Karate	£15.00
Knight Flight	£15.00
Mortville Manor	£15.00
Quboids	£9.00
Stone Raider	£13.00
Tank Busters	£15.00

BOOKS

Using the Psion Organiser	£10	QDOS Companion	£7
Assembly lang. Programming	£9	Technical Guide	£20
QL Advanced Programming	£15	QL Service manual	£20

Other QL titles available - phone for details

☆ SPECIALS ☆

GST Macro Assembler + Assembly Lang Book	£39
512K Expanderam + QFlash ramdisk/toolkit	£99

● ALL PRICES INCLUDE VAT AND UK MAINLAND DELIVERY - WE EXPORT WORLDWIDE ●

Phone for details of other QL products OR send SAE for our latest catalogue

Credit card phone orders accepted, or send cheques, postal orders, Eurocheques to:

TK COMPUTERWARE, STONE STREET, NORTH STANFORD, ASHFORD, KENT TN25 6DF

TELEX 966676 PMFAB G

VISA · EUROCARD · Access · MasterCard · BARCLAYS CONNECT · AMERICAN EXPRESS

FAX 0303 812892

QL SCENE

Digital Precision unwraps five packages

Digital Precision which, by its own admission had a quiet year in 1987 with only one all-new package, *Desktop Publisher* released, has five new programs for release. Four of the five should be available now and the fifth is scheduled for early February.

The first four programs, which Digital Precision supremo Freddy Vacher describes as "major," are *Success,* a CP/M emulation system; *Digital C,* a fast compact C compiler; *3D Graphics/CAD/Design System* — "the title says it all" — and *Microbridge,* a contract bridge player and tutor reviewed this month on page 29.

The fifth DP program is a flexible printer dump utility, *Ultraprint.*

Success, the "Supreme CP/M Code Emulation System," allows many programs written to run under the CP/M operating system to run on the QL. CP/M was developed more than a decade ago and has a large body of software written to run under it, including *WordStar, Lotus 1-2-3* and *dBase.*

Success takes Z-80 instruction groups from RAM, analyses them and executes the appropriate M68000 subroutines, operating at a speed equivalent to a 2MHz Z80.

CP/M BIOS hardware interfacing, BDOS file handling and CCP user communication are supplied. The BIOS gives the user seven drives — Microdrives, disc drives and RAMdiscs — and a flexible drive reconfigurator. The screen and printer ports are accessible, as well as two user-definable devices.

The package will give a contact address for a CP/M library — there is a great deal of software under CP/M in the public domain. A disc drive is necessary to capture the CP/M files but not otherwise.

Success, says DP, is designed for beginners but also gives guidance for accessing CP/M and Qdos at machine code level via the BIOS. Success is £49.95.

The high-level systems language C is gaining steadily in popularity because it gives a high degree of control over computer operation without resort to machine code. Digital C compact C compiler is, says DP, "the fastest C compiler for the QL. Our priorities were speed of execution and compilation, flexibility and compatibility with Qdos." The C implementation has been made more powerful than Small-C but compact and "very-SuperBasic like" in consideration of QL users who have begun to use SuperBasic.

Digital C is written in the Digital C implementation. There is no need for RAM expansions, ROM add-ons, discs, or an excessive number of cartridges. Digital C is £39.95.

MicroBridge is a contract bridge bidding and playing program which teaches bidding with 16 lessons accompanied by chapters in the extensive manual. Deals can be selected to be random or biased in favour of the player and make other choices affecting the style of the game. The Acol bidding system is used and is described fully in the manual. The program monitors the player's bidding and gives advice, which can be over-ridden.

Alternatively, the player takes the role of declarer and plays the computer, which determines the other three hands, MicroBridge, says DP, "understands the subtleties of card play and never cheats by peeping at hidden hands." Deals can be played over and over again and there is a skill monitor. MicroBridge needs an expansion RAM and disc drive and costs £34.95.

Ultraprint provides 22 sizes and styles of graphic dumps from any Epson- or Oki-compatible printer, with up to five passes of the printer. The program also has special PCB dump modes which will produce perfect originals for reproduction from PCB screen designed on the Digital Precision *Eye-q.* Ultraprint has an explanatory manual and costs £19.95.

3-D Graphics/CAD System was scheduled for release on February 1. The menu-driven program includes a 3D toolkit for use with users' programs and features the fast operation and wide range of functions characteristic of many DP packages. 3-D Graphics will cost £49.95.

For further details contact Digital Precision, 222 The Avenue, Chingford, London E4 9SE. Tel: 01-527 5493.

Programmers

Inspired by the overwhelming success of Pro-CAD 3, Datanet Systems is expanding and developing a new range of packages for the QL. Consequently Datanet Systems is looking for new and established programmers to work on existing programs and to develop new ideas for the QL.

Datanet Systems is also offering the support and backing of an established company to programmers wishing to have their products marketed professionally. For further details contact Datanet Systems, PO Box 121, Luton, Bedfordshire LU1 5SY.

QL SCENE

Freedom of the files

The National Council for Civil Liberties has produced a booklet briefing on the subject of the Data Protection Act, entitled *Your Right to See Your File,* which costs £1 inclusive of postage from the NCCL, 21 Tabard Street, London SE1 4LA. Tel: 01-403 3888. Two more extensive books on the subject are available from the NCCL.

Swedes are gathering in the North

It has been said that if two Swedes share the same interest they form an interest group and if there are three they start a magazine. In the experience of *QL World,* it does not require as many as three Swedes but a QL group has appeared with more than 400 Swedes under its aegis — the Svenska QL Gruppen of Sweden.

The group hopes to set up subgroups around Sweden, issues a periodic newsletter, *QLBladet,* has founded a software library in co-operation with the English QL group Quanta, gives courses in SuperBasic, the Psion suite, assembler programming and other subjects, and meets once a month at Chalmers University of Technology, Goteborg and FOA in Linkoping.

Membership is 100 Sweden crowns payable to the Giro account 62 81 58-8 in the name of Svensak QL Gruppen for one year.

The group can be contacted at Svensak QL Gruppen, Toftaasgatan 73, s-421 47 Vastra Frolunda, Sweden.

YOUR CHANCE TO MEET THE EXPERTS

Grand QL Teach-In featuring:

CHAS DILLON (The Editor, Cash Trader, Turbo)
SIMON GOODWIN (Supercharge, Turbo, Speedscreen)
PETER JEFFERIES (Task Master, Spellbound, Flashback)
FREDDY VACHHA (Mr Digital Precision)

Discussion Groups on major systems and programs and further information from:

- **Digital Precision —** 222 The Avenue, London, E4 9SE. Tel: 01-527 5493
- **Sector Software —** 39 Wray Crescent, Ulnes, Walton, Leyland, Lancs. PR5 3NA. Tel: 0772 454328
- **PDQL —** Unit 1, Heaton House, Camden Street, Birmingham, B1 3BZ. Tel: 021-200 2313
- **Creative Codeworks—** PO Box 1095, Birmingham, B17 0EJ. Tel: 021-426 5199

YOU MUSTN'T MISS

QL QUESTION TIME

Many new and loved software products available

Advanced Tickets £3 At the Door £4 Includes Buffet Refreshments

SUNDAY, FEBRUARY 28th, 1988 **From 12.30 pm to 8.30 pm**

TO BE HELD AT

THE MANAGEMENT CENTRE, UNIVERSITY OF ASTON IN BIRMINGHAM

For your advance ticket(s) send cheque/PO to any of the above and make payable to: QL Advisory Group

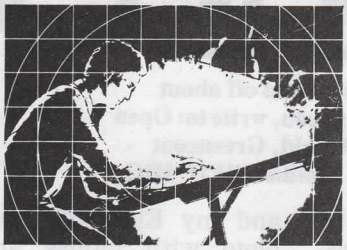
NAME .....

ADDRESS .....

.....

NO OF TICKETS REQ: ☐ *A QL ADVISORY FUNCTION

TECHNIQL



A superb 2D CAD package ideal for all general, technical, scientific and engineering applications.

- *FAST* multi-width printer output
- Full zoom with magnification
- Complete drawing tool library: lines, circles, boxes, curves, ellipses, polygons
- Cell edit - mirror, rotate scale, etc.
- Snap to grid
- Eight layers and 75 cells per design
- Full text manipulation
- Full instructions on cartridge

Suitable for flow charts, electrical designs, machanical drawings, letterheads/logos, architectural drawings and much more.

£49.95 Plus 50p P&P

WHAT'S NEW IN '88 FROM TALENT COMPUTER SYSTEMS

Our new 1988 catalogue features all the usual Talent favourites like:

3D CAD	£35.00
Assembler workbench	£24.95
Basic-ally	£19.95
Cartridge Doctor	£14.95
PCB1	£99.95
TechniQL	£49.95
GraphiQL+	£24.95
Strip Poker	£14.95
Lost Pharaoh	£14.95

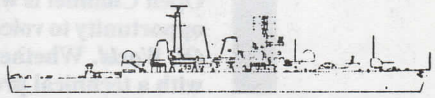
Plus many new additions. Phone or write for your free copy today!

Talent +
Stone Street, North Stanford Ashford,
Kent. TN25 6DF
Tel.0303 813883 Fax 0303 812892
Telex 966676 PMFAB G

Access VISA AMERICAN EXPRESS

TYPE 22

by J G Burns



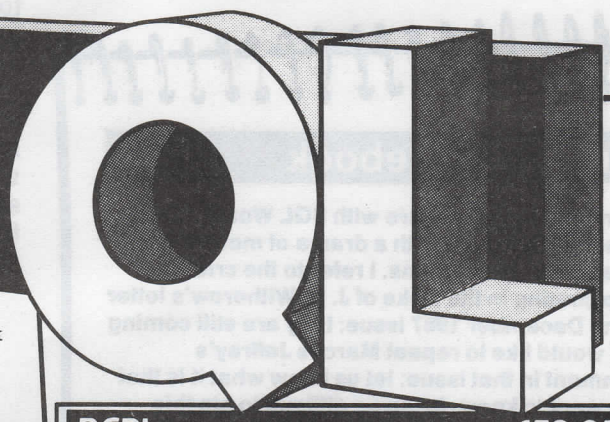
An excellent naval simulation program - one of the largest ever written for any machine, which has taken nearly two years to develop.

Type 22 is an accurate real-time simulation of a Royal Navy Type 22 frigate. You will be attacked by enemy aircraft, missiles, submarines and ships and will have to deal with over 20 targets at once.

The program uses a comprehensive and well thought out scoring system which gauges your performance accurately. The military detail is true to life throughout. Supplied with full instructions and guaranteed to give you hours of enjoyment. No two games are the same!

£17.95 Plus 50p P&P

RELEASE THE POWER OF THE QL



QLC £99.95 inc VAT

A professional specification C compiler for the QL. Designed by LATTICE®, QL is the most powerful and complete C compiler available for the QL. ► Complete Kernighan and Ritchie implementation. ► Full floating point arithmetic. ► Comprehensive library of UNIX and QDOS functions. ► Separate compilation. Linker. ► Powerful data types (inc. structures and arrays). ► Macros and conditional compilation. ► Over 90 detailed error messages.

ASSEMBLER £39.95 inc VAT

The best selling macro assembler for the QL. ► Full Motorola 68000 specification ► Macro expansions. ► Linker, directives, conditional assembly, and many other professional features.

QL PASCAL -NEW VERSION- **£89.95** inc VAT

A full ISO standard Pascal compiler. ► Fast, single pass Pascal compiler ► Complete inplementation of the ISO 7185 Pascal standard. ► Generated native code. Can be linked to assembler modules. ► Comprehensive error handling. ► Easy interfaces to QL features.

BCPL £59.95 inc VAT

A true compiler.
Ideal for systems programming-utilities, games, and applications.

LISP £59.95 inc VAT

LISP interpreter for exploring 'the language of artificial intelligence', with graphics.

QL APL £99.95 inc VAT

Keyword and Symbolic versions of this powerful APL interpreter by Micro APL. All standard APL facilities implemented with no restrictions and many extra features.

METACOMCO

26 Portland Square, Bristol BS2 8RZ
Tel: Bristol (0272) 428781
In the USA call 1-800-252-6382

Trademarks: UNIX-AT+T Bell Laboratories, QL, QDOS—Sinclair Research Limited

Prices include VAT, postage and packaging UK mainland only. Delivery, allow up to 28 days

Phone today or post this coupon to:
Metacomco, 26 Portland Square, Bristol BS2 8RZ.
I enclose a cheque for £_____ or debit my ACCESS/VISA

No: [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ] CARD EXPIRY DATE _____

NAME _____

ADDRESS _____

POSTCODE _____ TEL: _____

SIGNATURE _____ SQLW 2

Please send me:
- ☐ Assembler £39.95
- ☐ LISP £59.95
- ☐ BCPL £59.95
- ☐ QLC £99.95
- ☐ QL PASCAL £89.95
- ☐ QL APL *(Keyword)* £99.95
- ☐ QL APL *(Symbolic)* £99.95
- ☐ More information

OPEN CHANNEL

Open Channel is where you have the opportunity to voice your opinions in *Sinclair QL World*. Whether you want to ask for help with a technical problem, provide somebody with the answer, or just sound off about something which bothers you, write to: Open Channel, Sinclair QL World, Greencoat House, Francis Street, London SW1P 1DG.

Plea 1

I would like to say how much I agree with J. H. Witherow — Open Channel, December. I have not yet worked out how to load various utilities which I have, including Choice Toolkit, so that they can be used from memory. One loading eliminates a previous one. I am not unintelligent but I find that every book or manual assumes a certain degree of knowledge which not everybody has.

Take us by the hand and lead us to a satisfying use of a good computer. Having typed-in the stock control system from the User Guide, how do I run it? I either get as far as Proc. Start, or get a CANNOT OPEN FILE message with Archive, of course.

Might I add how much I enjoy the Progs *Golf* by Shergold and Tose?

A. V. Vere,
Leamington Spa.

Plea 2

I am writing with regard to a letter from J. H. Witherow in the December *QL World*. Being a relative novice I can fully appreciate his feelings regarding jargon and I would like to see some kind of two-page pull-out for beginners which could be put in a binder or folder for quick reference.

I would like to see Toolkit explained in a down-to-earth way. How does it work? What can I do with it? I have been using the QL User Guide from day one along with other computer books and I attend an evening class which I have found very informative. The fact that you can ask questions on the spot and receive an explanation at once is a great help.

I would like to get in touch with Witherow; perhaps we could exchange our problems and help each other in some way. I would like to hear from anybody who would like to contact me, so that we could perhaps form a QL Beginners' Club of some kind.

W. G. Johns,
12A Wenallt,
Dolgellau, Gwynedd,
North Wales,
LL40 1PW.

Plea 3

I have been trying to find courage to write to *QL World* for months. Now someone has done it for me. I must endorse his statements. I am two years behind Witherow, having 'gone QL' because of a bargain package too good to miss. Equipment has fallen into my hands which I fear I shall never understand.

I have read about my Assembler Workbench and my Eidersoft complete with mouse and frankly the poor things will die of hunger before anyone shows me where to put the cheese. Will someone please explain in plain English what happens beyond the first few pages of the many books I have read? They start in the most exciting and interesting manner, only to descend into what I call "superior know-all" language.

J. G. Cooper,
Ilkley,
West Yorkshire.

Editor's comment: These are just excerpts from a sheaf of letters agreeing with Witherow. This underlines the point that many QL users are comparative beginners and that many others, beginners or not, love their QLs for their entertainment value rather than for more abtruse technical reasons.

QL World *already has plans for a column for readers who want to extend their understanding of the QL and computing generally without descending to arcane depths. We hope to start it with the March issue.*

Toolkit aid

Would you explain the extra commands in the Tony Tebby Toolkit? I am interested in the direct access file commands when used with Microdrive.

William Hitchins,
Blackburn.

Editor's comment: If anyone would like to write on the subject, please contact me.

Editor's notebook

Commencing my tenure with SQL World, I find myself face to face with a drama of modest but meaningful proportions. I refer to the cries for help coming in the wake of J. H. Witherow's letter in the December 1987 issue: they are still coming in. I would like to repeat Marcus Jeffrey's comment in that issue: let us know what it is that you want to know. It can be difficult to pin this down, I know, but the more comments we have on what newer users find puzzling, the better will we be able to do something about it.

An apology to everybody who is waiting for news of submissions to Microdrive Exchange or The Progs, and indeed to people who have had programs accepted and not yet published. It has proved more difficult than we anticipated to keep up a steady flow at this end, but we are hoping to have a new software editor starting shortly. That should make all the difference.

Happy New Year to one and all from everyone at QL World.

TANDATA COMMUNICATIONS FOR THE SINCLAIR QL

UNBEATABLE PRICES!

Q-CONNECT Q-MOD AND Q-CALL NOW ONLY £80-49 INC. VAT & P&P

Q-CONNECT AND Q-MOD ONLY £47-64 INC. VAT & P&P

The only communications package for the QL. The modules are available separately but, by using all three as a complete matched system, full advantage can be taken of the integrated features.

Q-CONNECT

Complete RS232 output for general communications from 75-9600 baud with full two way buffering and flow control. Software on a micro drive to support all 3 modules includes Prestel Viewdata/Videotex and VT100 emulation, and many other features.

Q-MOD

Manual dial V23 modem operating at 1200/75 bps and 1200/1200 half duplex.

Q-CALL

Provides traditional pulse/loop disconnect auto-dial and auto answer.

tandata COMMUNICATIONS

Albert Road North, Malvern, Worcs. WR14 2TL
Telephone: (0684) 892421. Telex: 337617
Fax: (0684) 892422. Telecom Gold: 81:TAN001.

A subsidiary of Tandata Holdings plc
Prestel is a registered trade mark of British Telecommunications plc

Please send me
Q-Connect/Q-Mod/Q-Call at £80.49 inc. VAT & carr.
Q-Connect/Q-Mod at £47.64 inc. VAT & carr.
(delete as applicable)

I am enclosing a cheque made payable to Tandata Holdings plc OR charge my ACCESS/VISA account

Number _____

Expiry date _____

I'd like to know more about Tandata communications for the QL. ☐ (Please tick)

Name _____

Address _____

_____

_____

_____ Tel _____

SQLW 2

Send to: Tandata Communications, Albert Road North, Malvern, Worcs. WR14 2TL.

WDSoftware

FOR THE SINCLAIR QL:–

JOSS ..... £15 on mdv or 5¼" fip, £17 on 3½" fip

Forget syntax errors and mistyped names in file commands! Just move a cursor and press SPACE. Cursor keys or joystick allow access to up to 8 microdrives and all the discs your interface will handle, with up to 150 files on each. Scroll & print directories, COPY, DELETE or PRINT and file, select TV or Monitor mode before LOADing/RUNning a program. Use keyboard only to set date or label a medium. Easy to use with **Psion** or other software. No silly icons and to learn – JOSS will tell you what it's doing! Mass copying/printing utilities and programmer's toolkit. Specify disc size, tracks and interface **(CST, Cumana, PCML, MicroPeripherals)** or microdrive only.

RefQL7 ..... £11 on 2 mdvs or 1 3½" fip, £9 on 5¼" fip

For use with **ARCHIVE 2**, contains 1300 useful references and a search/print program. Find programs, articles and reviews buried in the magazines on your shelf! Cheap updates of earlier editions.

Mdv Extension Cable (8") £5.50

Add ZX Microdrives to you QL.

Joystick Adaptor £4.99

FOR THE QL, SPECTRUM, (ALL), BBC & ELECTRON:–

WD Morse Tutor .....£4 cassette, £6 mdv or 5¼", £8 3½"

Teach yourself to read Morse Code. From absolute beginning to 18 wpm! Feedback on screen or printer. Random letters, numbers or mixed, 100 random sentences, many helpful features include phonetic speech via Currah Micro-Speech (Spectrum). Discs unsuitable for a BBC B+.

PAYMENT

In advance, in **STERLING** on British bank branches, international Giro, Postal Order or **ACCESS/MasterCard**. Add £1 outside Europe for AIRMAIL.

From now on WDSoftware will be supplying a full range of serious software for the Amiga and S.T.

FROM:–

WDSoftware (QLW2)

Hilltop, St. Mary, Jersey, C.I. Tel: (0534) 81392

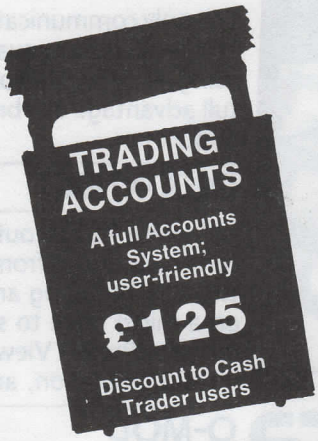
PDQL

SOFTWARE — HARDWARE — TAILOR-MADE SYSTEMS

YOUR PROBLEMS ARE OUR CONCERN

Systems for Businessmen

CASH TRADER UPGRADE version 2.4	
New Users	£80
Existing Users (send CT boot with order)	£39
UPGRADE for CT Upgrades	£10
(Support Scheme members)	£5
SUPPORT SCHEME MEMBERSHIP fee per annum	£15
CT ANALYSER (extra memory required)	£25
MAILMERGE de LUXE	£14
PDQ-PAYROLL	£70
SUPPORT SCHEME MEMBERSHIP fee per annum	£15
TRADING ACCOUNTS (extra memory required) New Users	£125
Special Discounts for Cash Trader Users	
SUPPORT SCHEME MEMBERSHIP fee per annum	£15



Programs for Programmers

ARCHIVE DATABASE ANALYSER	£7
ARCHIVE SCREEN FORMAT PRINTER	£7
PDQ-XREF	£15
SEDIT	£15
SuperBASIC MONITOR	£7

Programs for Everybody

ArchDEV/RTM version 2.38	£20
ARCHIVE TUTORIAL	£21
COMPARE	£10
FLASHBACK	£25
graFix	£16
IMAGE D	£24
LAZARUS	£20
NAMES & ADDRESSES (extra memory required)	£18
(with RTM extension)	£36
PSION PRINTER INSTALLER and Configurator enhanced and TURBOcharged	£6
PDQ-COPY	£8
RECOVER	£20
SPECIAL EDITOR latest edition (extra memory required)	£49.95
SPEEDSCREEN	£20
SPELLBOUND and FILEBOUND (compiled version) (extra memory required)	£35
FILEBOUND (send disc/cartridge and s.a.e.)	£5
TASKMASTER (extra memory required)	£25
PSION SUITE upgrades versions 2.35 Quill, Abacus, Easel and Archive version 2.38 **£5** each, send disc/cartridge and s.a.e.	

Programs for Leisure

DOMINATION	£9
OMEGA (extra memory required)	£14

HARDWARE

All hardware we sell is tested by us before delivery — ask for special terms for TRUMP CARD and NEC drives — 7% PDQL program voucher on hardware purchases. PLUS Unbranded 3.5 discs £20 for 10, Fuji MFDD £32.50 for 10; Fuji MD2DD 5.25 discs £22 for 10. Disc cleaning kits £15. THOR enquiries welcomed.

MANY OTHER General Utility, Archive Utility and Application Systems. NEW Systems or adjustments to existing systems built to order. All PDQL SuperBASIC programs are TURBOcharged. All PDQL built programs are THOR compatible.

PDQL

Computer Systems and Software

UNIT 1, HEATON HOUSE
CAMDEN STREET
BIRMINGHAM B1 3BZ

MAKE THE MOST OF YOUR QL AND THOR

for home or business use — Order from list or write for current catalogue. Prices include VAT and postage within the U.K. Cheques with orders to, and full descriptive list available from, PDQL. Please state details of toolkit, extended memory and/or disc

TRADING ACCOUNTS

A brand new flexible Accounts package — Cash Trader Data files easily converted — built at the request of Businessmen with extra book-keeping needs.
At least 256k memory required.
All the advantages of Cash Trader Upgrade plus many new features — navigation by initial letter as well as scrolling; varying size Groups a feature; Analyser included with Bank Reconciliation option, daily summary totals and other features designed to speed up both book-keeping and reporting **£125**
Special prices to existing cash Trader users as follows:

Quest Cash Trader users **£84**
Upgrade customers **£45**
Support Scheme Members **£40**
Upgrade customers with CT Analyser **£20**
Support Scheme members with CT Analyser **£15**

PDQ PAYROLL

Takes the aches out of producing the weekly pay-packets. Pre-printed pay-slips available. Handles all aspects and reports for PAYE purposes **£70**
Annual Support Scheme **£15**

PDQ COPY

Not merely a fast copier; it can compare two volumes displaying file sizes and dates copied, highlighting files of the same name but of different sizes. You can copy all files, by Y/N from the directory, by (up to three) strings , in alpha or arrival sequence, pause before over-writing, format option, all for **£8**

PDQ-XREF

Provides a full glossary of user-defined key words in your SuperBASIC program. Every occurrence listed in alphabetical order with line numbers reference and type of user summary gives warnings of names used but not defined, or defined but not used. Typing errors immediately spotted **£15**
LAZARUS raises from the dead those text files lost on disc — grieve no more **£20**
SPEEDSCREEN speeds up your QL, window handling, scrolling, etc, in Psion and other programs **£20**
SPELLBOUND checks as you type **£29.95**
FILEBOUND (Turbo'd) checks old documents in;
SPELLBOUND at three words per second (minimum)
Together **£35**
FILEBOUND on its own **£5** — send s.a.e. and blank disc/cartridge with remittance.
THE EDITOR SPECIAL EDITION printer driver included, block-copy by line, character or column, many other improvements **£49.95**

Access VISA

graFix

The printer driver you have been waiting for; now you can print from Front Page or Desk Top Publisher on any dot-matrix printer compatible with the QL. Very simple to install. Can rescale your graphics horizontally/vertically and it can print sideways **£16**

IMAGE D

A brand new three-dimensional drawing system with a difference — moves to any required perspective — displays four perspectives on demand — shaded options — option to combine a number of separate drawings — capable of designing commercial products and domestic items — create own 3D Logo **£24**

CASH TRADER UPGRADE

The Accounts program built for the small business. It provides a complete and easy-to-enter Accounting Routine with instant up-to-date Balance sheet, Profit & Loss A/C, Audit Trail, VAT Report and VAT Return as well as a Trial Balance.
Accountants us it — nuff said!

For new users **£80**
Existing users (send boot cartridge) **£39**
Annual Support Scheme **£15**
CT 2.4 Upgrade for Upgrade users send master disc/cartridges .. **£10**
(Support Scheme Members) **£5**

CT ANALYSER

Compatible with Cash Trader Upgrade — this new module provides the means of producing analyses for management and audit purposes. Needs extra memory **£25**
FLASHBACK the new data handling system **£25**
PSION Suite upgrades: v. 2.38 Archive and vs. 2.35 Quill, Abacus and Easel **£5** each — send s.a.e. + disc/cartridge with order
ARCHIVE TUTOR — gives a full explanation of the mysteries of the Archive language **£21**
COMPARE — displays in character, HEX or decimal any differences between two supposedly identical files; each sector containing a mismatch shown on screen; reposition by number and magic panel alignment to continue the scan. Program line numbers can be ignored **£10**
SEDIT is the easy way to create or edit your Archives screen; fast, coherent and with line graphics; full ink and paper colours **£15**
SCREENPRINT prints our your Archive Screen in three pages; as displayed, field lengths and co-ordinates; paper and ink colours .. **£7**
NAME & ADDRESS (extended memory only) gives a full database system, label printing, insert, amend, short and full listings — can be converted by you to suit your own special needs **£18**
(For ArchDEV/RTM users an RTM interface is available at an additional £18)
MAILMERGE de LUXE — The prince of Mailmerge systems designed for mail-shots, Club Membership Lists, etc. Write your Quill letter and use your Archive d/b to personalise both letter and label **£14**
RECOVER — Shed no more tears over your lost Archive database records; use RECOVER **£20**
ARCHIVE D/B ANALYSER scans your database records and reports full statistics on field usage **£7**
ArchDEV/RTM — The developed and run Time Module Archive package — version 2.38 ..... **£20**
TASKMASTER — Multi-tasking in comfort **£25**
DOMINATION — at last, time for leisure. THE game of economic and military strategy **£9**

CAMBRIDGE SYSTEMS TECHNOLOGY

24 Green Street, Stevenage, Herts SG1 3DS
Telephone: Stevenage (0438) 352150

THE Thor RANGE

The Thor computer systems are professional business machines designed with the user and his future requirements in mind. CST have developed several models with either single or double 3.5in, NEC floppy or 20M SCSI hard disc and floppy, making the Thor extremely versatile. Thors are quipped with 640K RAM, parallel and serial printer ports, battery-backed clock and a separate IBM style keyboard. Supplied free with all Thors is a customised version of the award-winning Psion Xchange software suite as well as ICE and T-dump. Special features of the Thor include multitasking at a single key stroke and enhanced screen windowing.

The Thor 20 system, using the high speed Motorola MC 68020 processor, delivers up to three times the computing power of the standard Thor. The Thor 20 package includes a suite of development software comprising a specially commissioned macro assembler by Talent Computer Systems and a linker by GST in addition to the Psion Xchange business software together with full supporting documentation. The Thor 21 system is designed for "number crunching" applications. Based on the 68020 and additionally incorporating the MC68881 floating point coprocessor, the performance of floating point operations are dramatically improved — taking only 1% of the time taken without the coprocessor. This system is essential for a wide range of scientific and engineering applications and only costs an additional £201.25 (inc. VAT).

MONITORS

CST now offer a choice of monochrome or colour monitor suitable for use with the Thor range of computers. The Philips CM8833 14" colour monitor includes interface lead and screen. The philips 7502 12" monitor has a dark anti-glare screen, horizontal/vertical size adjustment, position adjustment, brightness and contrast adjustment and a foldable foot. Both of these monitors have been selected by CST from the wide array of available monitors for their superior performance and reliability when used with the Thor computer range.

QDisc Interface

The best-selling floppy disk interface is fitted with a 16K EPROM containing many 'Toolkit' extensions, and CST's Ram Drive 2. It may be used with most 3.5 or 5.25 floppy disc drives. CST's own twin slimline double sided 80 track 3.5 units being exceptional value for money, with 720K of formatted storage per drive. The Toolkit provides a wide range of SuperBASIC commands and functions designed to improve access to the powerful facilities of the QL without the need for machine-code programming. Job control is made easier, files can be used for random access, alternative character sets can be produced, 'wild cards' can be used in file operations, etc.

The Ram Drive device driver allows free memory to be used as though it were a very high speed disc in fact the fastest such device when used with the RAM-plus. Ideally used for the storage of temporary results, or multiple screen images for animated displays, it also eases the copying of files in single disc systems. The Ram Drive can only use memory which is free, so the full advantage is only felt if the QL is equipped with additional memory. Built into QDisc 4 and Thor, the Ram Drive is also available on 3.5in. and 5.25in. floppy disc.

RAM plus

The CST RAM-plus unit expands the available memory of the QL to the limit of 640K. Using high grade 256K memory devices, this unit is the only one which offers the high performance of no waiting state operation. In fact the CST RAM-plus is the fastest ram expansion according to independent tests carried out by Digital Precision. Housed in a rugged metal case, the RAM-plus unit has an expansion slot which duplicates the QL's, allowing any other CST peripheral to be used with it.

NEW INTROM I AND Thor SPEEDSCREEN

CST are distributing two rom upgrades for the whole Thor range: SPEEDSCREEN & INTROM I. Installation costs a nominal £15 which covers return delivery, packing and insurance. Please insure your machine when you send it to us. Alternatively you can install the new roms yourself, instructions are included.

SPEEDSCREEN, using the new optimised code by Simon N. Goodwin, makes the Thor display up to twelve times faster. SPEEDSCREEN works with existing programs without alteration. Displays look just the same but are drawn much quicker. SPEEDSCREEN is also available on 3.5" or 5.25" floppy or microdrive for the QL.

INTROM I integrates the Talent Screen Editor., QJump's Toolkit II and Digital Precision's Turbo Toolkit SuperBASIC extensions and Buvex's Thor Dump screen dump into one package.

Please supply:-	UK inc VAT		Overseas	
Qdisc Interface 4 (3.5in. util disc)	£79.95		£72.70	
Qdisc Interface 4 (5.25in. util. disc)	£79.95		£72.80	
QEP-III Eprom programmer (QL/THOR)	£129.95		£116.00	
RAM-plus 512K QL memory	£139.95		£125.20	
CST Dual 3.5in. cased floppy discs	£219.95		£200.40	
CST Q-488 GPIB instrument interface	£224.25		£198.40	
CST QDISC SCSI interface	£230.00		£203.40	
Qdisc 4 + dual 3.5in drives	£275.00		£249.40	
Qdisc 4, RAM-plus + dual 3.5in. discs	£405.00		£363.60	
QL SPEEDSCREEN 3.5 ☐ 5.25 ☐ mdv ☐	£20.00		£18.00	
Thor 1F (Single floppy)	£688.85		£650.00	
Thor FF (Dual floppy)	£803.85		£750.00	
Thor WF (Winchester + floppy)	£1608.85		£1450.00	
Thor 20 1F (Single floppy)	£1292.60		£1179.00	
Thor 20 FF (Dual floppy)	£1407.60		£1279.00	
Thor 20 WF (Winchester + floppy)	£2212.60		£1979.00	
Thor 21 1F (Single floppy)	£1493		£1354.00	
Thor 21 FF (Dual Floppy)	£1608.85		£1454.00	
Thor 21 WF (Winchester + Floppy)	£2413.85		£2154.00	
Thor User Guide	*£20.00	☐	*£23.00	☐
MC68020 User's Manual	*£20.00	☐	*£23.00	☐
MC68881 User's Manual	*£20.00	☐	*£23.00	☐
Talent 68020/68881 Assembler	*£34.50	☐	*£33.00	☐
*refundable on purchase of appropriate Thor				
For the Thor Range:				
Philips Monitor (Monochrome)	£92.95	☐	£111.40	☐
Philips Monitor (Colour)	£295.00	☐	£300.40	☐
Beige Mouse	£74.75	☐	£72.00	☐
Psion Chess	£24.95	☐	£22.70	☐
INTROM I from interlogic	£49.45	☐	£44.00	☐
SPEEDSCREEN rom for Thor	£29.90	☐	£27.00	☐
ROM installation on your Thor	£15.00	☐		
Floppy Discs 3.5", pack of 10	£15.00	☐	£14.00	☐
Additional 12m Service contract (1F&FF)	£85.25	☐		
Additional 12m Service contract (WF)	£115.00	☐		
QL Trade-in against Thor Deduct £70 (UK) £60 (O/S) ☐	Export administration Airmail outside Europe		£5.00 £10.00	☐ ☐

Please complete in full

Name .....

Address .....

.....

..... SQLW 2

Post Code..... Telephone .....

I enclose a cheque/PO of £ .....

Please deduct my Access/Mastercard/Eurocard/Diners Club/Vector a/c

Card No. | | | | | | | | | | | | | | | | |

Expiry Date .....

Signature .....

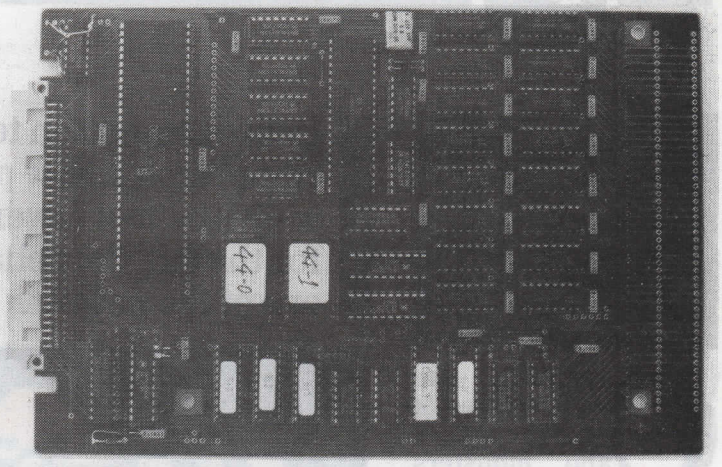
Access BARCLAYCARD VISA MasterCard DINERS CLUB INTERNATIONAL

Prices are inclusive of carriage
CST reserve the right to alter prices and specifications without prior notice

CST Thor TIMES CST
No 880107

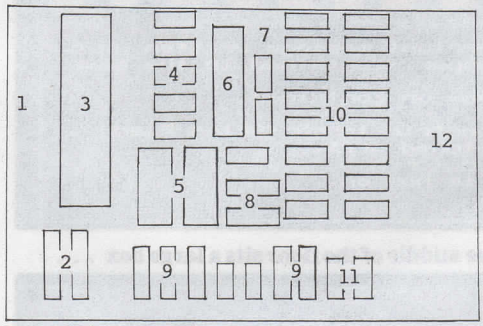
Thor XVI: The Inside Story

"We're begining to see light at the end of the tunnel" was how Graham Priestley, Production Manager at CST put it as the testing stage of the Thor XVI was drawing to a close recently, "I'm now keeping my fingers crossed that there won't be any major hitches with the initial production run!" he said.
CST have rejected the simplistic solution of stretching the 8 bit designs already in production; they have chosen a completely new architecture while still guaranteeing compatibility across their range of products from the 8 bit 68008 in the original Thor to the 32 bit 68020 used in the THOR 20.



Dominating the XVI's main processor board is the 68000 chip.

New Main Processor Board



1. QL Compatible 64 pin DIN expansion slot and 50 way connector to I/O board (which mounts above the main processor board); 2. 16 to 8 bit bus adapters for expansion slot; 3. 8MHz 68000 processor; 4. 20 bit RAM address multiplexers; 5. Operating System EPROMs: 2 of 64 Kbyte each; 6. Hitachi 6445 Advanced video display controller; 7. 16MHz system clock generator; 8. Data buffers for memory array; 9. Programmed logic devises (5); 10. RAM (512 Kbytes); 11. Video shift registers; 12. RAM expansion slots (3, of up to 2Mb capacity each).

Major Components of the Processor Board

CST's approach is "at least one microprocessor per user," and so the best way to produce a 'multi user' system is by networking independant machines, rather than expecting a single processor to handle several users at once.

TWO INTO ONE

CST are convinced that a large proportion of the common peripheral functions carried out inside a microcomputer actually slow the main processor down significantly. If these tasks are handled by a separate dedicated chip, the main processor is free to operate at full speed for the maximum amount of time. With this in mind the philosophy of the QL is continued, and there are TWO microprocessors in every THOR.

The main processor board of the THOR XVI contains a 68000 processor running at 8 Mhz. The onboard half Megebyte of memory is multiplexed between the processor and the video control circuitry, which generates a superset of the QL video modes. The expansion memory slots allow up to 6 Megabytes to be added currently (with the new 4 Mbit devices this will be increased further). All input and output functions are carried out by a 2MHz 6802 on the I/O processor board, which is designed to be standard across the range of THOR machines. Video pixel rate is 10.67 MHz, which allows a 512 pixel per line display on a standard monitor without overscan. The video modes now include a 16 colour facility for colour monitors which have an intensity input, or a 16, level grey scale in monochrome.

The QL compatible expansion slot allows the use of existing add on card (except memory).

PDQL Computer Systems and Software

WHAT SINCLAIR QL WORLD SAID about
PDQ-PAYROLL: . . . payrolls run in a fraction of the previous time . . . a very attractive program . . . reliable and fast."
"ARCHIVE TUTOR is about the best introduction to the database system."
"PDQ XREF . . . details the total number of Hames, occurrences, alphabetical listing, line numbers etc. in your SuperBASIC program . . . one of the most valuable development utilities I have seen . . . an indispensible aid."
All PDQL SuperBASIC programs are TURBOcharged. All PDQL built programs are THOR compatible.

Dear Hilde . . . THOR TIMES AGONY AUNT

I received my Thor recently and it has been in heavy use ever since. I am worried about overheating, as I can't hear the cooling fan and CST don't seem to understand my problem. Should I turn the air conditioning up?

Yours
Hot and Bothered
High St, Oman

Dear H and B

No sweat, your machine doesn't have a fan — it doesn't need one. The Thor has a well ventilated metal case and can take even your climate problems! It might be an idea not to leave your Thor out in the rain too often though.

Keep Cool!
Hilde

PRINTERS ADD TO RANGE

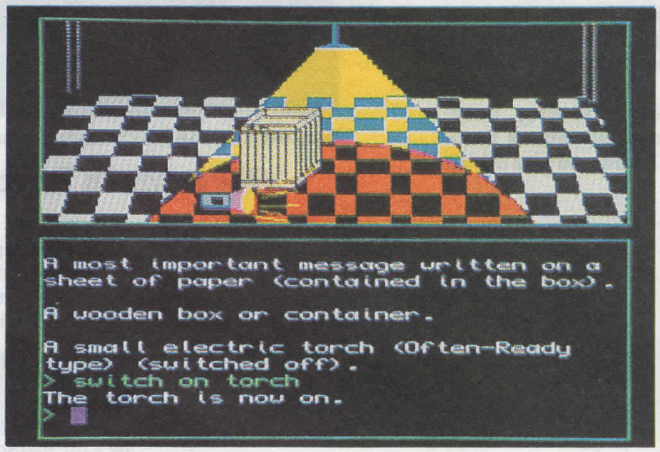
CST have announced they shall be including printers in their range to coincide with the launch of the Thor XVI. "There has been a growing demand for complete systems," stated Stephen Gregg, Dispatch Manager. "However extensive trials were needed before CST could recommend any particular models." Those supported range from the workhorse Epson LX800 dot matrix at £287.50 to the fine letter quality Juki 6100 at £458.85.

Next Month: The XVI's Inovative I/O Processor

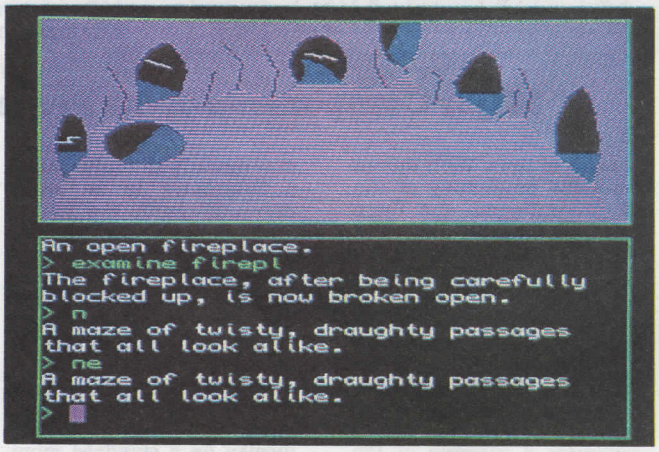
SOFTWARE FILE

Imagine
Price: £19.95
Shadow Games, 1-2
The Cottages,
Maidenhatch,
Tidmarsh, near
Reading, Berkshire
RG8 8HL.

Improvements in text compression now permit more sophisticated adventure writing for the QL. Cordelia Bloom tries one of the newest.



Imagine: in the middle of the floor sits a large box . . .



. . . and draughty passages twist into the distance.

Combining the best features of maze, magic and monsters with a Sherlock Holmes-type flavour, the Shadow Games newest release, *Imagine,* is the first of what is almost certainly likely to become a steady supply of text adventures provided with interactive graphics to add atmosphere and player participation.

A game requiring something of an analytical approach to solve the many puzzles used to provide hours of entertainment, Imagine has been in the development stages on a variety of computers for more than two years. The original version was written in Fortran on a DEC mini-computer and, almost paradoxically, was the reason why the APT adventure-writing system was developed.

The starkly-illuminated opening scene of Imagine reveals a vast room in which you see a large box of the packing crate type — enclosing an informative note — and a torch. Initial play requires that you pick up or touch various objects contained in the vast room. Imagine has two features which I will not spoil by describing them in detail. Suffice it to say that, once you have left the vast room after collecting particular objects, you have to navigate a series of caves and tunnels to reach the orange room.

From the orange room you must negotiate a complex maze to find the delightfully Nagging Wife. Altogether, Imagine includes about 100 locations, 70 objects — some of which are not immediately apparent to the player — and a 350-word vocabulary, all of which will run on a standard 128K QL.

One of the most appealing aspects of Imagine is that all the information you need to complete the play successfully is included in the game. Ample clues, including a map at one of the locations showing you how to negotiate the maze, are provided and I recommend that you have pencil and paper to hand for mapping your routes.

Imagine aptly demonstrates just what the APT system is capable of doing. You may save your current position at any time and, if you meet an untimely end, you can re-start the game from the position saved. Various objects may be set alight en route and PT multi-tasking QFill routines adds considerable realism to the occasion.

The APT auto-repeat feature allows you to enter a previous command by pressing the down cursor key. Dialogue with the game requires minimal typing. Although this APT adventure follows the usual conventions of entering "e" for east and so on, one of the features of the system is that, so long as the characters entered are distinctive to the word required, it will be allowed as if the word were spelt in full.

Thus, to find the state of your health, the parser will require a minimum of the first four letters to indicate exactly which word you wish to enter. If you type only "he," the APT system will prompt for a better indication of the word you require.

After playing Imagine far longer than was required to complete this review, my feeling is that it has combined the best elements of humour admirably with sound principles of program flow and logic. Packed with features, Imagine is lively and full of fun and destined to become a QL classic.

Take the brakes off your QL display!

SPEEDSCREEN

If you're frustrated by slow QL displays, SPEEDSCREEN is the answer. It replaces Sinclair's slothful screen routines with a new code that's up to TWELVE TIMES FASTER. It makes virtually all QL software much friendlier and more responsive.

SPEEDSCREEN speeds up text and user-defined graphics output by up to 12.6 times. Window cleaning and cursor operations are much quicker and scrolling can be 8.2 times faster. As QL WORLD reviewer Mike Lloyd put it last month:

"The speed increase is phenomenal . . . SPEEDSCREEN does everything Creative CodeWorks claims . . . the package is well thought-out, thoroughly tested, easy to use and sensibly priced.

"It has the advantage of enhancing almost every piece of software available, and does so without imposing restrictions and without requiring any computer literacy from the user . . . SPEEDSCREEN will be very popular indeed."

Creative

CodeWorks

P.O. BOX 1095, BIRMINGHAM
B17 0EJ, U.K. ☎ 021 426 5199

QL SPEEDSCREEN costs £20 on disk or tape (please state) inc. first class or airmail postage anywhere. PAYMENT MUST BE IN STERLING: UK P.O.'s, Eurocheques, Bank Drafts or cheques drawn on a UK bank. 7 day service.

SPEEDSCREEN is also available NOW, in ROM form only, for users of the CST THOR, price £30. A QL ROM cartridge version will be launched on 27/1/88, priced £30. All versions come with a full manual, new character sets, a design utility and toolkit commands.

The next program from Creative CodeWorks is **QUICKFAX** — a 'card-file' database that is easy to use and very fast.
QUICKFAX is being developed and tested now.
It will cost £20.
To find out more please send us an S.A.E.

BYTEBACK

THE QL SPECIALIST

QUEST FOR THE DRAGON SWORD

A challenging text adventure with a large vocabulary, hundreds of locations, mases of original puzzles and several sheep . . .

"Witty, difficult and entertaining! How could anyone wish for more?" . . . *QL World Nov '87*

"I laughed until I stopped!" *B Baggins*

£14.95

Detacad 2 by Datakey
User friendly CAD for plotters **£17.50**

Datakey by Datakey
Stock control and database **£14.00**

GAMES		Only			Only
Tank Busters	Sellasoft	14.00	Scrabble	L.Genius	12.50
Type-22	Talent	16.00	Spook	Eidersoft	9.00
Hover Zone	Talent	12.50	Karate	Eidersoft	12.50
Farmer	Talent	12.50	BJ the Return	Eidersoft	8.00
Deathstrike	Talent	12.50	BJ in 3D Land	Eidersoft	7.00
Strip Poker	Talent	12.50	Citadel	Eidersoft	7.00
Jungle Eddi	Talent	12.50	Zapper & Eagle	Eidersoft	7.00
Lost Pharoah	Talent	12.50	Stone Raider 2	Microdeal	12.50
Blocklands	Digital	8.50	Flight Simulator	Microdeal	12.50
Droidzone	Digital	8.50	3D Chess	Psion	17.00
Super Backgammon	Digital	11.00	Match Point	Psion	12.50
Super Croupier	Pyramide	12.50	Caverns	Sinclair	7.00
Mister Smith	Pyramide	8.00	Meteor Storm	Sinclair	7.00
Vroom	Pyramide	13.00	QL Defusion	Realtime	8.50
Wanderer	Pyramide	17.00	3D Slime	Datalink	11.00
Othello 3D	Pyramide	17.00	Hyperdrive	English	12.50
Bridge Player 2	C.P.Soft	16.00	S. Davis Snooker	CDS	12.50

ADVENTURES		Only			Only
Horrorday	Talent	12.50	West	Talent	12.50
Nemesis	Talent	12.50	Zkul	Talent	12.50
Dragonhold	Rubicon	12.50	Mortville Manor	Pyramide	17.00

ART & DESIGN		Only			Only
TechniQL	Talent	43.00	The Designer	Pyramide	17.00
Technikit	Talent	21.00	Nucleon	Pyramide	17.00
PCB Designer 1	Talent	85.00	Graphic Toolkit	Pyramide	12.50
PCB Designer 2	Talent	45.00	Super Sprite Gen.	Digital	25.00
GraphiQL +	Talent	21.00	Eye-Q	Digital	25.00
Sign Designer	D.S.Ents	16.00	Viewpoint 3D	Rubicon	17.00

PROGRAMMING		Only			Only
Supercharge	Digital	42.00	Assembler Dev. Kit	Metacomco	34.00
Turbo + Toolkit	Digital	84.00	C Dev. Kit	Metacomco	79.00
SuperForth	Digital	34.00	Pascal Dev. Kit	Metacomco	75.00
Better Basic	Digital	21.00	Lisp Dev. Kit	Metacomco	49.00
Assembler W'kbench	Talent	21.00	Basic-Ally	Talent	25.00

UTILITIES		Only			Only
Front Page	Gap	21.00	Front Page Extra	Gap	35.00
Task Master	Sector	24.00	Desktop Publisher	Digital	59.00
Spellbound	Sector	29.00	The Editor	Digital	25.00
Touch Typist	Sector	11.00	Editor Special Ed	Digital	35.00
Qspell (mdv)	Eidersoft	15.00	Super Media Mgr	Digital	34.00
Qspell (disk)	Eidersoft	19.00	Pro Astrologer	Digital	45.00
ICE (Eprom)	Eidersoft	25.00	Super Astrologer	Digital	21.00
*Drawing OffICE	Eidersoft	15.00	Cosmos	Talent	12.50
*Icicle	Eidersoft	12.50	Wimp Designer	Talent	13.00
*ICE Toolkit	Eidersoft	11.00	Qimp	Talent	21.00
*ChoICE	Eidersoft	14.50	Sideways	Talent	17.00
*ArtICE	Eidersoft	12.50	QL Toolset	Talent	17.00
*ICE Berg	Eidersoft	12.50	Cartridge Doctor	Talent	12.50

HARDWARE	Only		Only
Joystick Adaptor	4.50	Microdrive Cartridges	1.80
Suncom joystick	6.50	4 Cartridges in Wallet	7.50
Quickshot 2 joystick	8.00	Transform Storage Box	4.50
Quickshot TURBO joystick	13.00	20 Cartridges in Transform Box	39.00
The ARCADE joystick	17.00	Miracle Expanderam 512	75.00
Miracle Trump Card	189.00	Miracle Centronics Interface	18.00
Miracle QL Modem	45.00	3.5" Disks (10*DS/DD)	12.00
Star NLQ Printer	229.00	Atari 520 ST-FM	275.00

SPECIAL OFFERS	Only
4 Game Pack (BJ Returns, Citadel, Zapper and Eagle)	15.00
QL Technical Guide	17.00

ALL PRICES INCLUDE VAT AND FIRST CLASS POST
TELEPHONE (0636) 79097 FOR PERSONAL ASSISTANCE
Send Cheque/PO to:

BYTEBACK 6, Mumby Close, Newark, Notts NG24 1JE

QUANTUM COMPUTING PRESENTS

QMONIX CODE SOFTWARE

Item	Name	Price
# U01	Cloney The Copycat	£10.00
# U17	*Qmonix File Manager	£14.00
# B10	*Qmonix Address Book	£14.00
# B11	Qmonix Checkbook Manager	£19.00
# S01	Qmonix Keyboard Drill Sergeant	£10.00
# S06	*QL Kitchen Aid	£14.00
# S07	*Qmonix Computer Chef	£14.00
# G05	*QL Tabletop Draw Poker	£10.00
# C08	*Qmonix 300 Baud Conference Multi-Window Terminal Program	£15.00

Gridland–Holocast **£9.00**
(nuclear war simulation game)

Now you can conduct your very own multi player nuclear war simulation. Right within the privacy of your own home.

Q-CAL!

Memory resident pop-up background calendar for the QL.

* Means Programs Require Supertoolkit II Commands

To Order Contact:

IN EUROPE:
HB COMPUTER SALES
LITTLETON HOUSE
LITTLETON ROAD ASHFORD
MIDDLESEX TW15 1UQ
TELEPHONE: ASHFORD (MX) 0784 248616

IN AMERICA:
QUANTUM COMPUTING
BOX 1280
DOVER, NEW JERSEY 07801 — USA
TELEPHONE: (201) 328-8846

S.UPER U.SER B.UREAU

Genuine independent professional support for all users of the SINCLAIR QL, CST "THOR", SANDY "Futura", and QXT-640.

Do you need a QL product?

★ Do you need something for your QL, and you don't know where to get it? Do you know what you want, but don't know whether it will work on your machine? Do you just want a good deal?

Are you wondering if we stock that item you really want?

★ We cannot stock everything, but we can get almost anything!

★ We stock or supply products from all the leading QL companies.

Qjump, Sandy, Digital Precision, Sector Software, Compware, Gap Software, Liberation Software, Miracle Systems, Datanet Systems, Creative Codeworks, PDQL, Spem, Qualsoft, Metacomco, GST, Pyramide, Talent, Care, Psion, Microdeal, *and manyh more...*

★ We stock or supply all the latest products and advise on them.

Speed Screen, Flashback, Deathstrike, 3D Designer, Trump Card, Qmulti, Success, QL Terminal, Qliberator Budget, Miracle Midi Interface, QL Terminal, QLiberator Budget, Turbo, Page Designer 2, Office Junior *and many more...*

★ *We stock or supply many of the old favourites and can supply programs that you thought were no longer available for the* ***QL.***

GST QC, Flight Simulator, Chess, Scrabble, *and many more...*

★ We can supply hardware and peripherals of many sorts quickly! For example printers from ***Epson, Citizen, MP, Juki, Amstrad, Star, Seikosha,*** *and many other items. Ask us to quote a price...*

Now how do I contact ***S.U.B.*** *about my needs or order?*

Write to us at the address below. Phone us on (0388) 773737, send us a FAX on (0325) 467164, send us a mailbox on Prestel, (mbx 219998590) or TELEX 934999 TXLINK G (Reference 219998590)

SEE US AT THE ZX MICROFAIR!

★ Please note, **S.U.B.** is completely independent of all other companies.

S.U.B., PO BOX 3, SHILDON, DL4 2LL

S.UPER U.SER B.UREAU

Genuine independent professional support for all users of the SINCLAIR QL, CST "THOR", SANDY "Futura", and QXT-640.

Do you ever need some help?

★ Do you ever feel that you need someone who can look at that nagging problem with your QL system another way, and can help you solve those irritating gaps in the manual... Yes? Read on!

Are you still thinking of suscribing to ***"QL S.U.B?"***

★ This is a summary of the advantages of doing so now!

★ Membership is by annual subscription to the magazine.

★ A year's subscription brings 12 issues, each of at least 40 pages long, and containing news, comment, previews, reviews of the latest hardware and software, letters, answers to some common problems, program listings and articles on various interesting subjects such as communications, programming and technology. There is also space for readers' letters, sales and wants, words of wisdom from contributors, or an interview and a competition.

★ As a member, you are entitled to special discounts off QL items, (both hardware and software) which means that you could even save the cost of membership on your product purchases!

★ Access to all the other developing features of **S.U.B.** such as the public domain software library, the bulletin board, (Super User Board) with all its special features and budget software.

★ *Lastly, we are a full time support group. That means that we are here to help all the time, not just in our spare time. All you have to do is contact us, and we will help you to find a solution to your QL problems, or to that nagging puzzle.*

If I decide to join, how much is it, and how do I pay?

Membership is by annual subscription to ***"QL S.U.B."*** *magazine.*

★ *Home user, in the UK, £15.00, abroad £20.00 paid in sterling.*

★ *Business user in the UK, £30.00. Enquire for foreign costs.*

★ *Sent 60p for an introductory copy of* ***"QL S.U.B."*** *magazine.*

Cheques or postal orders should be made payable to ***"S.U.B."*** *Foreign payments are best made by Eurocheque or Postal Order. Sorry, we cannot accept any credit cards at present. (Soon)*

★ Please note, **S.U.B.** is completely independent of all other companies.

S.U.B., PO BOX 3, SHILDON, DL4 2LL

SUPER BASIC

Mike Lloyd explores stacks and queues and discovers a maze-searching algorithm

Vectors, or single dimensioned arrays of fixed length were introduced in last month's SuperBasic feature. The discussion led to a look at multi-dimensi onal arrays which can be regarded as being many identical vectors arranged side by side although, in fact, arrays are conceptually unrelated to vectors. This month's article also takes vectors as its starting-point but develops the theme in an entirely different direction.

Vectors are only one member of the family of linear lists, the simplest of data structures. It will be recalled that a vector is an ordered set of a fixed number of like values held in a relatively inflexible way. Linear lists in general have fewer limitations than vectors. One definition of a linear list is "a set of homogenous values whose structural properties comprise only the relative positions of the values."

In simpler terms, a linear list is a collection of similar values linked one to the next. Every item except the last in the list has a single successor and every item except the first has an exceptional predecessor, making the whole data set one-dimensional. The major differences between linear lists in general and vectors in particular are that linear lists are dynamic and they do not necessarily rely on the physical locations of the data to indicate their order. Linear lists can therefore grow and shrink as items are added and deleted and elements can be arranged physically in one order and accessed in another.

When the relationship between one item and the next is simply that it is next to it, the link is said to be implicit. Most lists have implicit links between their elements. Telephone directories have their elements arranged in alphabetical order; it is not necessary to include a reference after each name to indicate where the next name is to be found.

Links

The same is not true of entries in a thesaurus, where words are arranged in groups according to their meaning. Entries frequently include cross-reference to related word groups, representing explicit links between one word and its logical successors. A special index is required to locate given words and their synonyms.

Travel directions can be given in the form of a list with explicit links: Lichfield, A38; Birmingham, M5; Gloucester, A40; Cheltenham, STOP.

Each town is followed by a link to its successor. This structure is very different from that of a two-dimensional array because its elements are not necessarily homogenous; town names are character strings while road numbers might be coded into integers. In explicity-linked data structures, the road names would be replaced by the memory address of the next element.

A full examination of linked lists belongs elsewhere in this series. The other difference between vectors and lists is that lists can grow and shrink. This month's article highlights some special dynamic lists which could have either explicit or implicit links. To reduce complications, however, the examples used are all linked implicitly.

A surprising number of operations can be carried-out on lists of information held in a computer. Some of the more useful are:

Accessing, i.e., reading or altering the *n*th value.

Inserting a new value after the *n*th value.

Deleting the *n*th value.

Counting the number of values in the list.

Sorting the values into order.

Searching for a particular value.

Linear lists

Programmers rarely need to implement all those operations on a particular list. It is particularly irksome to have values inserted or deleted within the body of an implicitly-linked linear list because of the disruption it causes. Additions and deletions therefore are frequently limited to either end of the list.

Stacks are linear lists which allow changes to be made to their contents only at one end. An analogy is from card games like rummy where cards are discarded on to and picked up from the top of the pack. The last known card to be discarded is the next card to be picked up, a concept known to accountants as Last In, First Out. Stacks are sometimes called LIFO lists.

A less satisfactory analogy is that of the machine for storing plates which are sometimes seen in cafeterias. As plates are added to the stack its spring-loaded based descends to that only the top plate is accessible. This analogy

has given rise to the expression to *push* a value on to a stack and to the term *push-down stack.*

The stack elements do not move when new values are added — the stack grows taller. Neither are lower values entirely inaccessible, because they can be read and even altered. *Stack* is just one of the many misleading computer descriptions which were intended originally to be helpful.

The opposite process of pushing items on to a stack has been dubbed *popping*. Once again a colourful analogy distorts the truth, because all that happens is that the "top of stack" pointer is moved down one position. The value thereby excluded from the stack is not obiliterated until a new value is pushed on to the stack which over-writes it. Listings one to four allow a stack to be defined and operated on.

There are many uses for stacks, some of which will be the subject of future articles, but an interesting demonstration of the power of stacks is shown in the accompanying feature on maze searching, which uses the PUSH procedure and the POP function listed.

Restricted

Although stacks are dynamic structures they are ultimately restricted by the memory space allocated to them. An over-estimate of the stack's memory requirements will waste space, while an under-estimate will cause usually fatal overflow error. Overflow might lead to a program being abandoned or a routine might be called to release more space for the stack. The QL is particularly well-suited to overflow recovery routines because programs, data and system blocks can be moved round in memory.

Sometimes more items are removed from a stack than there are additions made to it and therefore the stack becomes empty. This condition is known as underflow and can be dealt with either by abandoning the program or by finding some new values, real or dummy, to make up the shortfall. In the listings overflow and underflow halt the program.

Overflow

Stacks rarely need to grow to anything like the maximum size suggested by the data they handle, so memory can be allocated by estimating the most likely stack size and adding a percentage for luck. Highly-complex algorithms have been developed to improve the accuracy of estimates for memory requirements but the process remains uncertain.

Where a program has more than one stack they could share a single memory area. Two stacks can be anchored at either end of their shared memory area and grow towards the middle so that only when the combined size of both stacks exceeds the allocated space does an overflow occur.

Where more than two stacks exist some of them will have to "float" the memory space. Two pointers will be needed for each stack, one to point to the stack's working end and the other to indicate the base location of the first item. When two stacks collide, more room is obtained by re-locating one or more of the stacks.

Algorithms to perform this task intelligently can be complex. As the total available space fills there is a stage when the stacks are moved so frequently that the program is seriously degraded. This occurs typically when the memory area is between 75 percent and 90 percent full, depending on the number of stacks and the efficiency of the algorithm.

Queues share some of the features of stacks, the main difference being that additions and deletions are made at different ends of the structure. The obvious analogy is a bus queue — people join the queue at one end and board the bus at the other. Like stacks, queues have a variety of computing applications. A common example is a keyboard or printer buffer which accepts characters for printing at one end and removes them at the other. The process is described aptly by the accounting term First In, First Out.

Queues need two pointers, one to indicate the head, where deletions are made, and

Listing 1

```
100 REMark establish STACK
110   Max = 500
120   DIM Stack (Max)
130   Ptr = 0
```

Listing 2

```
200 DEFine PROCedure Push (Value)
210 Ptr = Ptr + 1
220 IF Ptr > Max
230   PRINT#0; "Overflow": STOP
240 ELSE
250   Stack (Ptr) = Value
260 END IF
270 END DEFine Push
```

Listing 3

```
300 DEFine FuNction Pop
310 IF Ptr = 0
320   PRINT#0; "Underflow": STOP
330 ELSE
340   Ptr = Ptr - 1
350 RETurn Stack (Ptr + 1)
360 END DEFine Pop
```

Listing 4

```
400 DEFine FuNction Access (Offset)
410 IF Ptr - Offset <0
420     PRINT#0; "Underflow": STOP
430 ELSE
440     RETurn Stack (Ptr - Offset)
450 END IF
460 END DEFine Access
```

Amazement meets

The most efficient maze-searching algorithm has long been a holy grail for programmers. The objective of the exercise is to give a computer-controlled mouse sufficient intelligence to find its way out of a maze in the shortest time and with the fewest moves. Apart from basic rules governing the construction of the maze and the way the mouse reads the maze map, the programmer has complete freedon about the way the program is written.

A maze is a grid of squares in which some squares represent impregnable walls and others represent paths. The mouse begins its search anywhere in the maze and its goal is the home square at the edge of the maze which represents escape. Only vertical and horizontal movements are allowed. The paths are one square wide and must not form loops. The finished maze looks rather like a crossword puzzle and is represented in the computer by a maze map formed by a string array with zeros for walls and ones for paths.

The mouse detects whether the four squares adjacent to the square it is occupying are walls or paths by reading the maze map. The mouse cannot alter the maze map.

The simplest search algorithm in this type of maze is to tell the mouse always to follow the walls on its left, because by doing so it must eventually reach the home square. That is too easy. A better method, involving only slightly more computing power, which eventually would become inefficient, as the available free space reduced to about 20 percent of the total memory area. Clashes would occur more often where some busy queues were intermingled with slowly-moving queues.

The final member of this class of linear lists is the double-ended queue or *deque* — pronounced deck. Like the dealing action of a cardsharp, additions and deletions can occur at either end of a deque. Deques can be considered as being either two queues or two stacks added together but, whereas stacks have tops and queues have

```
Listing 8
800 DEFine PROCedure Init
802 LOCal x, Row, Col
804 RESTORE 836
806 Size = 16: DIM Map$ (Size, Size)
808 FOR x = 1 TO Size: READ Map$ (x)
810 WINDOW 512, 256, 0, 0: PAPER 0: CLS
812 WINDOW 308, 190, 102, 32: BORDER 5, 36
814 INK 7: CSIZE 3, 0
816 FOR Row = 1 TO Size
818   FOR Col = 1 TO Size
820     IF NOT Map$ (Row, Col)
822       BLOCK 16, 10, (Col) *16, (Row) *10, 34
824     END IF
826   END FOR Col
828 END FOR Row
830 Max = 100: DIM Stack (Max): Ptr = 0
832 Push 0: Push 34: Home = 258: Mou$ = CHR$(183)
834 END DEFine Init
836 DATA "0000000000000000"
838 DATA "0101001011111111"
840 DATA "0111111000100000"
842 DATA "0001001011111010"
844 DATA "0111001010001010"
846 DATA "0101101111110010"
848 DATA "0100110010101110"
850 DATA "0101010100101000"
852 DATA "0111011101101110"
854 DATA "0101010101001000"
856 DATA "0101011011111010"
858 DATA "0011101010100110"
860 DATA "0110101000100100"
862 DATA "0101101001010100"
864 DATA "0101001111111110"
866 DATA "0000000000000000"
```

the other to indicate the tail, where additions take place. Computer queues normally do not shuffle up like a bus queue when elements are removed; all that happens is that the head pointer is altered. Busy queues can therefore by very inefficient because the head and tail pointers can stride through enormous amounts of memory without becoming more than a handful of data positions apart.

Least helpful

The least helpful cure for this problem is to allocate more memory space into which the tail can move; it is made only slightly more acceptable if the memory space abandoned by the head pointer is reclaimed somehow. Another possibility, almost as unhelpful, is to keep the head location static and move elements towards it; this is time-consuming even in machine code.

A more useful algorithm is to re-set the queue to the beginning of the memory space whenever it becomes empty. Another is to force the queue to be acted on, and therefore emptied, whenever it becomes full. The latter suggestion is commonly-used in printer buffers, the algorithm being extended so that the queue is flushed if the channel to which it belongs is closed.

The easiest way to make use of otherwise dead space is to make the queue circular, so that when the tail pointer reaches the final data position in the memory area it then moves back to the first data position. Of course, by that stage elements will have been removed from the head of the queue, thus creating space at the beginning of the data area. Overflow would occur only if the tail caught up the head. Listings 5, 6, 7 establish a circular queue in a SuperBasic array.

It is possible to operate several queues in a single memory area, all chasing each other round in a large circle. Clashes would have to be resolved by shunting down whole queues

```
Listing 5

500 REMark establish QUEUE
510   Max = 100
520   DIM Queue (Max)
530   Head = 1: Tail = 1
```

a mouse in a maze

can be described as follows:

1, Proceed until the exit is found or a dead end is reached.

2, If a dead end is reached, backtrack to the last unexplored turn-off.

3, Never explore anywhere twice.

Listing nine converts these rules into a SuperBasic procedure. A single stack is used to hold map references for each location and the illegal directions relating to each location. Illegal directions are those blocked by a wall square and those which the mouse has visited previously. When the mouse is searching new territory in accordance with rule 1, the algorithm works as follows:

Find current square by taking top value from the stack.

Fetch the list of "illegal" directions from the stack.

Check each direction in turn.

If a legal move can be made then:

Amend "illegal" directions accordingly.

Return "illegal" and "current location" values to stack.

Move forward.

When the mouse is backtracking under rule 2, the stack operations are:

Remove the last location and "illegal" analysis values from the stack.

Move to that location.

If the location is a junction, check for previously unexplored directions.

If there is one, take it.

If not, keep backtracking.

The mouse will search exhaustively all possible options until it finds the exit and at the finish the shortest possible route between its starting-place and the exit will be stored on the stack.

The maze can be redesigned by amending the data strings. New values of MAX can be used to change the size of the maze. The behaviour of the mouse can be altered by amending the *search_maze* procedure.

```
Listing 9

900 DEFine PROCedure Maze
902 LOCal Here, Illegal, New_way, Loop
904 REPeat Loop
906 Here = Pop: Illegal = Pop: Show_Mouse
908 IF Ptr = 0:Illegal = 15 - Analyse
910 IF Illegal <15
912   LoP = 15 - Illegal
914   FOR New_way = 0, 1, 2, 3
916     IF 2 New_way && LoP
918       Push Illegal + 2 New_way: Push Here
920       SELect ON New_way
922         = 0: Here = Here - Size
924         = 1: Here = Here - 1
926         = 2: Here = Here + 1
928         = 3: Here = Here + Size
930       END SELect
932       IF Here = Home: EXIT Loop
934       LoP = Analyse
936       Push 15 - (LoP - 2^(3 - New_way))
938       Push Here: EXIT New_way
940     END IF
942   END FOR New_way
944 END IF
946 END REPeat Loop
948 BEEP 25000, 1, 20, 400, 30
950 AT Home MOD Size, Home DIV Size:PRINT CHR$(183)
952 END DEFine
```

```
Listing 10

1000 DEFine PROCedure Show_Mouse
1010 LOCal x, y
1020 x = Here DIV Size: y = Here MOD Size
1030 OVER -1: AT y, x: PRINT Mou$
1040 BEEP 1000, 100, 3, 500, 200, 2, 12
1050 PAUSE 5: AT y, x: PRINT Mou$: OVER 0
1060 END DEFine Show_Mouse
```

```
Listing 11

1100 DEFine FuNction Analyse
1110 LOCal x, y
1120 x = Here DIV Size: y = Here MOD Size
1130 RETurn 8* Map$ (y, x+1) +  Map$ (y, x-1) + 4* Map$
  (y+1, x) + 2*Map$ (y-1, x)
1140 END DEFine
```

The maze listings, lines 800 onwards, refer to listings two and three which should also be entered before the program is run.

heads and tails, it is best to think of deques as having left and right ends.

Simplex

The operation of a deque is simpler than the number of addition and deletion options might suggest because only two pointers are needed. Overflows occur whenever one end or the other reaches the bounds of the reserved memory area and underflows occur if the pointers both point to the same position when a read operation is attempted.

Extra limitations can be imposed on deques, for instance by allowing additions or deletions to be made only at one end. These are known as either imput-restricted or output-restricted deques.

Implicit-links linear lists are flexible, powerful data structures, but they still have disadvantages imposed on them by the lack of explicit links between one item and its logical successor. This theme will be resumed when data structures are returned to in the not-too-distant future but next month's SuperBasic column will be tackling a different topic.

```
Listing 6
600 DEFine PROCedure Add (Value)
610 IF (Tail +1) MOD Max = Head
620   PRINT#0; "Overflow": STOP
630 ELSE
640   Queue (Tail) = Value
650   Tail = (Tail +1) MOD Max
660 END IF
670 END DEFine Add
```

```
Listing 7
700 DEFine FuNction fetch
710 LOCal Temp
720 IF Head = Tail
730   PRINT#0; "Underflow": STOP
740 ELSE
750   Temp = Queue (Head)
760   Head = (Head +1) MOD Max
770   RETurn Temp
780 END IF
790 END DEFine fetch
```

MIRACLE SYSTEMS LIMITED

14 day full money back guarantee on all products
12 month warranty on all products
All prices include VAT and P&P

QL MODEM £49

★ New printout software

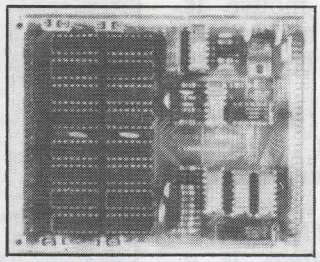
★ 1200/75 e.g. PRESTEL, T/GOLD
★ Autodial
★ 3 metre cable
★ Plugs into SER2
★ Includes Viewdata software
★ Includes 80 column software
★ Not BT approved

QL MODAPTOR £39

★ New printout software

★ Interfaces QL to standard modem
★ 300/300, 1200/75, 1200/1200
★ Autodials with DTR
★ Plugs into SER2
★ Terminated by 25 way D
★ Includes Viewdata software
★ Includes 80 column software

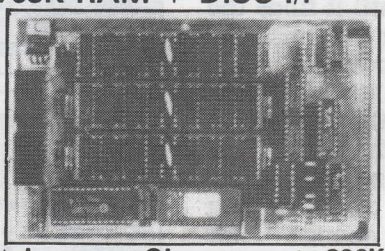
QL EXPANDERAM 512K £75



★ Increases QL memory to 640K
★ Through connector for i/f
★ Low power consumption
★ Can speed up some programs
★ Able to use larger Quill docs etc
★ Black cover included

QL TRUMP CARD £199

768K RAM + DISC I/F



★ Increases QL memory to 896K
★ Standard 3½/5¼ inch disc i/f
★ Screen Dump
★ RAM Disc
★ Printer Buffer
★ Memory Cut
★ Toolkit II
★ £50 Expanderam trade-in
★ FREE 'T' shirt

QL CENTRONICS £19.50 PRINTER INTERFACE

★ Plugs into SER1 or SER2
★ Standard Centronics plug
★ Default baud rate 9600
★ 3 metre cable

QL QUADRAPRINT £19.50

★ 4 QL's to 1 printer
★ 5 metre cable £7.50
★ 10 metre cable £12.50
★ 20 metre cable £19.50

QL SERIAL CABLE £7.50

★ 25 way D plug
★ 3 metre cable

QL JOYSTICK ADAPTOR £4.99

★ Atari/Commodore J/S to QL

TRUMP CARD Plus twin 720K 3½" Disc drive £349 inclusive

Tel: (0454) 317772

Orders welcome by telephone or post

MIRACLE SYSTEMS LTD., Northavon Business Centre, Dean Road, Yate, BRISTOL, BS17 5NH, U.K.
West German distributor: Jeposoft, Kruppstr 9, 4040 Neuss 21, Tel: 20107 8184

Please send me .....

Please find cheque enclosed to the value of £.....

or debit my credit card ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ Expiry date ☐☐/☐☐

Signature .....

Send to: Name .....

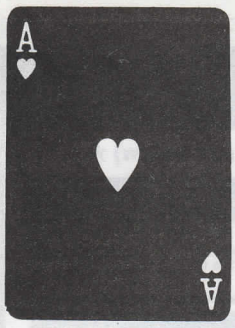
Address .....

.....

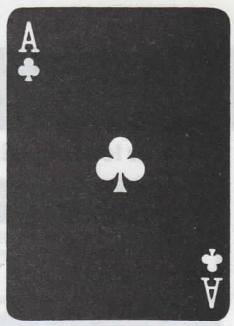
.....

SQLW 2

MIRACLE SYSTEMS LTD., Northavon Business Centre, Dean Road, Yate, BRISTOL, BS17 5NH, U.K.

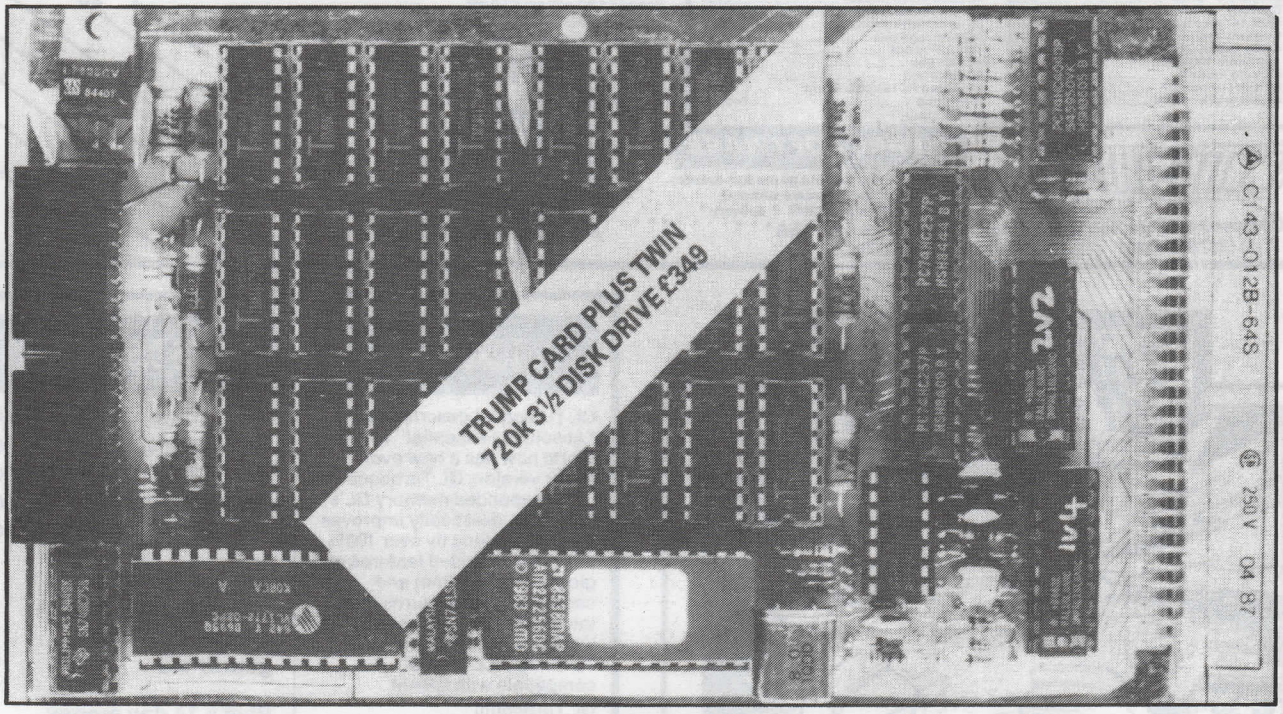


MIRACLE SYSTEMS
Tel. (0454) 317772



TRUMP CARD

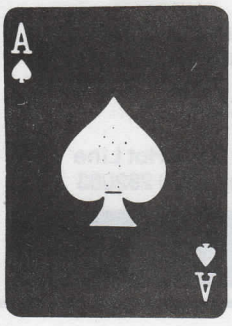
- 768K RAM making 896K total
- Disc Interface
- Toolkit II
- RAM Disc
- Screen Dump
- Printer Buffer
- Memory Cut



(THE TRUMP CARD IS SUPPLIED COMPLETE WITH COVER)

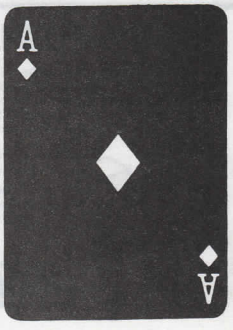
Price £199.00 inclusive

MIRACLE SYSTEMS LTD., NORTHAVON BUSINESS CENTRE, DEAN ROAD, YATE, BRISTOL, BS17 5NH, U.K.



Plug in the TRUMP CARD and you have a QL expanded to its maximum of **896K**. Its Disc Interface is fully compatible with QDOS, Psion packages, Superbasic, etc., To make maximum use of the 896K the ROM software includes both static and dynamic RAM discs and a Serial Port printer buffer. The Screen Dump enables the screen to be copied to a dot matrix printer. Memory Cut lets programs that used to run only on an unexpanded QL run with the TRUMP CARD. And Tony Tebby's Toolkit II provides a comprehensive range of Basic extensions.

If you order directly from us then you not only get the 12 month warranty but a 14 day money back guarantee as well. We are also giving away a **FREE** MIRACLE SYSTEMS 'T' shirt with every retail order! For those of you who already have an EXPANDERAM 512K don't despair — we will also give you £50 trade in for it against a TRUMP CARD. So for peace of mind and a 'T' shirt, order direct from us by phone, quoting your ACCESS/VISA number or by post with a cheque, etc. WE LOOK FORWARD TO HEARING FROM YOU.



NEW PRICES FOR 1988!

★ New lower retail prices, but also super discounts when you spend more than £50 on hardware (see below) ★

QL EXPERT £49.95
Learn about and write expert systems
- Boolean, fuzzy and custom probabilities
- Multiple goal paths
- Trace, How, Why, What-if

MEGA-TOOL BOX £29.95
Adds 170+ mostly original commands
- Windowing
- Multitasking
- Graphics
- QDOS facilities

Demo cartridge £5 (redeemable)

QL PASCAL £29.95
Exceeds the ISO standard!!
- Fast
- Efficient
- Simple to use
- Professional

TASK SWOPPER £15.95
The smallest truly multitasking Swopper
- True job cloning
- Access to Basic
- Even on 128k QL
- Background print

PRO-MONITOR £29.95
As monitor plus symbolic debugging (Return old cart + £15 to upgrade)

MONITOR £15.95
Powerful, full featured debugger
- Many unique facilities

ASSEMBLER £19.95
The fastest QL Assembler
- Editor
- Linker

FORTH £29.95
Professional Forth 83 compiler
- Fast and compact
- Many extensions

TYPING TUTOR £14.95
Professional tuition in easy steps
- Speed and accuracy measurement

COPYCAT £10.99
Backs up most protected cartridges in no time

BOOT 128K £5.99
Run "128k only" programs in your expanded QL

1 TO 1 DUMP £5.99
Undistorted screen dump to an Epson FX80 printer

MULTI-PRINT £5.99
Print multiple copies of files with this multitasking program

MDV TOOLKIT £9.99
Extensions to read/write mdv sectors, headers etc

ALMDV TOOLKIT £14.95
1000 lines of commented source code for mdv header and sector access

COMBINED MDV T'KIT £19.95
MDV and ALMDV toolkits on one microdrive

HARDWARE BARGAINS

Sinclair QL (30 day warr)	£119	Parallel printer cable	£15
Sinclair QL (12 month warr)	£149	QL ROM cartridge	£10
Trump card (768k + disc I/F)	£189	27128 (16k x 8)	£6
512k Expandaram	£90	4 mdvs in wallet	£7.50
Cumana disc interface	£79	10 new mdvs (loose)	£18
Single 3.5" drive	£139	10 used mdvs (loose)	£15
Dual 3.5" drive	£219	20 new mdvs in box	£39
CUB 14" monitor + stand	£279	20 used mdvs in box	£29
One way mains filter	£14	mdv storage box	£5
4 way mains filter	£24	Ten 3.5" discs	£29
Astracom 1000 modem	£149	40 disc box	£14
Miracle modem	£49	80 discs box	£18
Parallel printer I/F	£20	(Amstrad PC1512 SD mono	
Serial printer cable	£15	(one only)	£400!)

MEDIC UPGRADES ● CALL

GIVEAWAY OFFERS

Spend over £50 and get up to £30 off the above software
(Note offer does not apply to QL Expert, Mega, Toolbox or Forth)

Spend **£50** and get **£5 off**
Spend **£100** and get **£10 off**
Spend **£150** and get **£15 off**
Spend **£200** and get **£20 off**
Spend **£300** and get **£30 off**

eg: Buy Trump Card and single disc drive for £328 and get PASCAL free!

(Note: giveaway offer applies for limited period only)

Total £

Please send:

Name/Address:

COMPWARE

FREE SOFTWARE

- Ask for full price list and product details
- Dealer + Export orders welcome
- Prices include UK, VAT + delivery

ZX Microfair
Stands 85-86
February 6

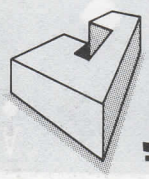
Compware, 57 Repton Drive, Haslington, Crewe CW1 1SA
Tel: (0270) 582301 (Tlx: 265871 quoting MAG70076)

QLW2

A NEW QL MEGA-TEXT ADVENTURE

During a routine flight to the moon Admiral Cola and Captain Franklin learn that the moonbase and mineral mine have been taken over by hostile aliens. To avoid enemy radar they land their spacecraft some distance from the base and then set off on a dangerous mission to recapture it.

Packed onto two cartridges this big-value mega-text adventure contains over 150 descriptive and imaginative locations and a wide variety of problems, traps, mazes and puzzles with logical solutions.



It includes an extensive vocabulary, over 50 objects and a number of intelligent characters capable of carrying out tasks.

Special offer £10 (including postage and packing). Send you cheque or postal order to the address shown below. Or telephone 041 552 0759 and quote your Access or Barclaycard number.

Javid Systems 15 Duke Street Glasgow GL2 0JE

QL TURBOQUILL +

QL Turboquill described as "absolutely essential" by QL World now has a new even faster version. QL Turboquill + for expanded memory QL's only TQ+ drastically improves screen handling by over 100%, this plus the added features of a glossary (keydefine) and capslock indicator turns quill into a slick, fast professional word processor. QL TURBOQUILL + now compatible with QRAM

QL Turboquill + £13.50 inc VAT pp

QL Turboquill £11.50

Taskmaster £25.00

Spellbound £29.95

QL Turboquill + and Spellbound £41.50

QL Turboquill + and Taskmaster £37.00

New product flashback the **RAM,** based on information storage system, ten times faster than the ARCHIVE only **£25.00 inc**

Please state required on MDV or 3.5 disk

Also your quill version (ie 2.3 or 2.35). Prices include VAT, postage labels

"DISKS DISKS DISKS"

Quality	3.5 DS/DD	3.5 SS/DD	5.25 DS/DD
10	£11.50	£10.95	£6.00
30	£32.00	£31.40	£13.80
50	£52.90	£49.90	£21.80
100	£100.05	£94.30	£39.50

Call for the lowest priced quality Discs in the UK. Lifetime guarantee

Plus a 14 day money back guarantee

Express same day dispatch 1/10 disks storage box (10 disks) £1.50 inc

---

Cheque/PO to: Athene Consultants, 33 Holly Grove, Fareham, Hants PO16 7UP

Credit Card Hot Line No. Tel: 0329 282083

SANDY QL NEW YEAR SPECIALS

Come and see us at the ZX Microfair on February 6

NEW - NEW - NEW - SANDY SUPER KEYBOARD - NEW - NEW - NEW - NEW

Separate keyboard with real keyswitches in a custom moulded body with 10 Function Keys, Full Numeric Pad, Single Key Underscore, Hotkey, standard QL layout for main section, superb light positive action with no repeated characters, fold-up tilt feet, fitted in 10 minutes, completely compatible with all QL soft and hardware. Fit the best — there's no comparison!

NEW - SANDY DISK DRIVES - NEW - SANDY DISK DRIVES - NEW

Single 5.25" Double Sided, Double Density, 40/80 Track, Switchable I, MBYTE Disk Drive with Integral Power Supply. Complete with cables to fit your QL Disk Interface. Only £120!

QL Multi has a 3.5" Double Sided, Double Density, I MBYTE, Disk Drive combined with a 5.25", Double Sided, Double Density, 1 MBYTE 80/40 Track Drive in one small casing with Integral super smooth Power Supply, Mains Fuse and Front Panel Mounted, Illuminated Power Switch — Comes complete with cables to plug in and run with any Disk Interface

NEW - SANDY DISK DRIVES - NEW - SANDY DISK DRIVES - NEW

HARDWARE

SINCLAIR QL JM 128K	£120.00
SINCLAIR QL JS 128K	£130.00
SINCLAIR QL JM 640K	£185.00
SINCLAIR QL JS 640K	£195.00
INTERNAL 512K RAM CARD	£85.00
THRU-CON 512K RAM CARD	£90.00
SUPERDISK INTERFACE	£80.00
SUPERQBOARD OK RAM	£100.00
SUPERBOARD 512K RAM	£179.00
SQB + MOUSE COMPLETE OK	£150.00
SQB + MOUSE COMPLETE 512K	£240.00
SQB RAM UPGRADE 512K	£90.00
QIMI INTERNAL MOUSE I/F	£29.50
QIMI WITH REAL TIME CLOCK	£39.50
QIMI + QRAM	£54.50
QIMI + MOUSE	£68.00
QIMI + MOUSE + QRAM	£88.00
NEC SINGLE 3.5 DISK DRIVE	£15.00
NEC DUAL 3.5 DISK DRIVE	£180.00
MITSUBISHI SINGLE 3.5	£95.00
BARE NEC 3.5 DSDD DRIVE	£75.00
BARE MITSUBISHI 3.5 DRIVE	£60.00
QLMULTI 3.5/5.25 DRIVE	£209.00
5.25 40/80 SWITCHABLE DRIVE	£120.00
SERIAL PORT CABLE	£4.50
JOYSTICK PORT CABLE	£4.50

MONITOR CABLES

PHILIPS 14" COLOUR MONITOR + lead	£274.00
MICROVITEC 14" MQ3 COLOUR + LEAD	£259.00
PHILIPS 12" GREEN MONITOR + Lead	£84.00
SCHON KEYBOARD UPGRADE	£54.50
SANDY SEPARATE KEYBOARD	£90.00
CITIZEN LSP10 PRINTER	£170.00
SERIAL/PARALLEL CONVERTER	£19.00
PARALLEL PRINTER CABLE	£8.50
10 VERBATIM 3.5" DSDD DISKS	£19.50
25 VERBATIM 3.5" DSDD BULK	£34.70
50 VERBATIM 3.5" DSDD BULK	£66.00
MICRODRIVE 4 PACK	£6.99
MICRODRIVES 10 BULK	£16.65
QEP III EPROM PROGRAMMER	£125.00
QEP EPROM CARTRIDGE	£5.99
MOUSE MAT ANTI/STATIC	£8.00
QL JOYSTICK	£7.49
QL DUST COVER	£5.00
MDV STORAGE BOX	£5.00
QL POWER SUPPLY	£25.00
2000 SHEETS LISTING PAPER	£17.00

SOFTWARE

QTYP SPELLING CHECKER	£19.95
QMON II MONITOR/DEBUGGER	£19.95
QPTR POINTER TOOLKIT	£29.90
QRAM FROM QJUMP	£29.90
QL: CP-M EMULATOR	£44.95
RAM DISK	£7.50

QL spares and keyboard membranes always in stock

SPECIAL OFFER — Superdisk Interface + single Disk Drive only £170.00

SANDY (UK) PCP Ltd

Unit 33, Murdock Road, Manton Lane, Bedford MK41 7PQ. Tel: (0234) 219814. Fax: (0234) 270133

VISA

Prices include VAT and carriage. Export enquiries welcome

Access

EIDERSOFT QL

ICE

NEW PUBLISHING OFF-ICE £24.95p
Incorporating an enhanced version of mouse arts. Everything you need to design your newspaper or publication.
Disk + Expanded Memory only req

ICE £26.95p
+ Choice Multitasking Program £14.95p
+ Toolkit especially for ICE users £14.95p

ICE is a ROM based utility program that turns your QL into an ICON controlled "state of the art" computer. Not only does it add a number of functions not found on a standard QL including calculator and calender, it also makes all basic functions a dream to use.

ICE + MOUSE was £79.95 NOW £59.95p

The Eidersoft mouse combined with the above ICE rom gives your QL the power of the Apple Macintosh or GEM. Mouse control is implemented on all packages that use the ICE system, which gives a very smooth and fast response that will not be outrun. If you already have ICE we offer a £10.00 trade in if you return your existing ICE.

ARTICE + MOUSEART £14.95p

A keyboard or mouse controlled graphics program. The features include circle, line, box, free hand draw, paintbox colours and brushes, copy, transfer and save image. Epson printer dump, undo, spray can, recolour text mode 4 and 8 operation.

ICICLE £14.95p

A multi-tasking utility that allows you to set up your own ICONS for the control of programs, including QUILL, ABACUS and a host of other programs. As well as a full ICON editor it includes a printer spooler and printer manager.

DRAWING OFF-ICE £24.95p

3D screen designer aimed at producing true 3D images on your screen. The perspective is automatically calculated to a given vanishing point. This is not some complex co-ordinated program which requires you to work out every point of the 3D object in advance. Requires 3½" disk drive. This program now includes an enhanced version of mouse arts. Expanded memory required.

ICE BERG £14.95p

Set of comprehensive backup facilities which can be called up at almost any point when you are using your QL. It includes full wild card functions i.e. back-up all – doc or – pic files. The program also boasts a AUTOBACKUP feature backing-up specific files say every 10 minutes without you having to do anything.

GAMES

FULL HOUSE £12.95p

A poker game with the added dimension of a one armed bandit style gamble facility.

BJ RETURNS £10.95p

Is the excellent sequel to QL caverns incorporating many of the excellent features and graphics of the original game.

BJ IN 3D LAND £10.95p

BJ is lost again! This time in a 3D maze that will pose a challenge to all (70 screens).

KARATE was £19.95 NOW £14.95p

Incredible graphics, 18 different movements including kicks, punches and somersaults. Multi screen action, large flicker free sprites, multi player option, sound effects, keyboard or joystick control.

SPOOK £10.95p

Probably one of the best versions of Pacman for any Micro computer.

GAMES PACK £16.95p

Comprising of ZAPPER, the classic arcade game, Eagle, a defender type game, and Citadel where you must unravel the secrets of a giant city as you steer your craft through 50 screens of danger and excitement and, finally, BJ returns.

ESS membership – £9.95

BIG DISCOUNTS AND IMMEDIATE ADVICE! ! !

UTILITIES

Q KICK £14.95p

Multi-tasking utility program including DESK, CLOCK, FILES, NOTES and TOOLS, similar to SIDE-KICK on PC available only on disk.

GRAPHICS CONSTRUCTION KIT £14.95p

A set of utilities that allow you to construct your own pulldown menus in SUPERBASIC.

Q WRITER £14.95p

A marvellous utility for anybody who wants something different from their printer. Includes 29 different character sets of Epson compatible printers.

Q-SWITCH £14.95p

Multi-tasking that permits a quick switch from ARCHIVE to ABACUS, QUILL or EASEL suspending tasks while jumping to another task. Written by the author of ICICLE and KEYDEFINE this is a very popular package.

QSPELL £24.95p

A spelling checker for Quill, supplied with a dictionary of 25000 words and checks a 4 page in 24 secs.

Q-FLASH RAM DISK £14.95p

Allows the user to define ram disk; programs can then be instantly saved and re-loaded. A print spooler is also included to allow you print whilst using other programs.

QL to PC £29.95p

Transfer your existing files to a PC for use within XCHANGE, PC FOUR or any standard DATABASE, SPREADSHEET or WORDPROCESSOR. Price includes software for both machines and cable.

QL to ORGANISER £39.95

Transfer both ways your existing QL files within exchange. Complete with software and cable.

QL TECHNICAL BOOKS (Set of 7) UNDER ½ PRICE at £19.95p

PC FOUR for IBM compatibles SPECIAL PRICE £69.00p

SPECIAL 10% DISCOUNT 1 MONTH ONLY

Microdrive Storage Box	£4.95p
Microdrive Storage Box with 10 cartridges	£22.45p
Microdrive Storage Box with 20 cartridges	£39.95p

ORGANISER

The machine that thinks with you

Diary	
Alarm	
Calculator	
Address Book	
Organiser II CM	£99.95p
Organiser II XP	£139.50p
Finance manager	£29.95p
Dictionary	£29.95p
Comms link	£59.95p
Spreadsheet	£39.95p
16k datapak	£19.95p
32k datapak	£34.95p
64k datapak	£79.95p
128k datapak	£99.95p
Book on Organiser	£9.95p
QL to Organiser	£39.95p

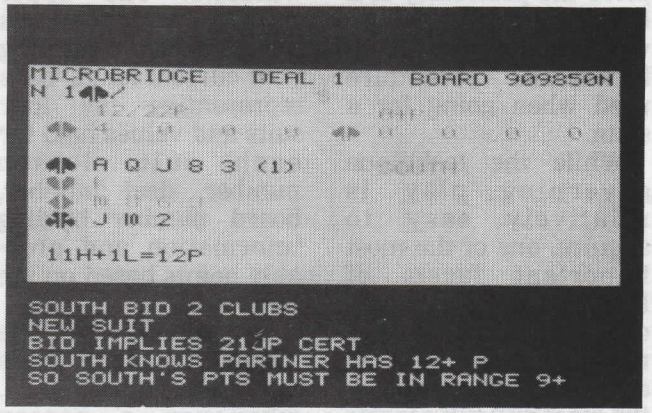
WINTER SALE
1 MONTH ONLY
10% OFF ALL PRICES

EIDERSOFT QL
86 COMMERCIAL ROAD, PADDOCK WOOD, KENT TEL: 0892 832552

VISA

A bridge goes far

Ron Massey finds that Microbridge is a friendly partner in the great card game.



Program: MicroBridge. **Price:** £34.95. **Source:** Digital Precision, 222 The Avenue, London E4 9SE. Tel. 01-527 5493.

Programmers utilising techniques applied in expert systems — programs in which the knowledge of a highly-skilled person is used to form the framework or rules of its operation — have been finding increasingly wider applications in the field of leisure activities. Although common use of expert systems on the QL curiously has taken much longer than one might expect, various developments have provided an accurate indication of the many possibilities in which the QL is particularly adept.

Of its nature, Contract Bridge is only one of the many fields in which the use of expert structuring of the formal aspects of Bridge has benefitted both active and potential player alike.

Expert systems

There can be little doubt that Contract Bridge is the most popular of all card games and is enjoyed worldwide as a social pastime. Leaping into the breach again, Digital Precision has released another program with epic proportions.

MicroBridge, one of those rare programs which may be described with equal accuracy as a game, a tutorial and a leisure activity, is a decidely user-friendly system with which you may learn the more esoteric aspects of Bridge and have a vehicle with which to practise your new-found skills. MicroBridge includes some of the ideas used in expert systems to make the program more informative.

If not properly defined, algorithms establishing the parameters used to control Bridge, Chess or any other game where strategy plays an important part, can provide a means whereby cheating by the computer can occur.

This is most noted in games which, by their nature, all the information regarding the play is not readily available and the "hidden" hands are fluid in that, with a little study of the "opposition's" play, you will find that cards or pieces being played are not where you would expect them to be. In effect, card values dealt and played by the machine seem to shift between the synthesised players.

Problems with some of the other Bridge programs can occur where a limited number of variations are available and, if played often enough, there is a high degree of predictability. Even more common, the hands held by the computer contain certain characteristics, such as an opening hand with a specified strength or point value or always strong and a particular suit combination.

MicroBridge has been biased towards the player; with any given hand you have the opportunity to make your contract or not; the QL will play the "hidden" hands in an attempt to prevent you from making your Contract. In a manner of speaking, this is not a Bridge program in the usual sense but one is designed first to be instructive and second fun to play.

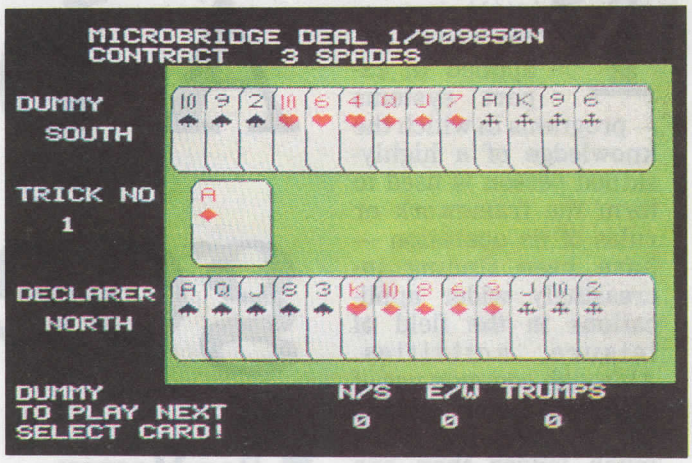
Inferences

One of the features found in other Bridge programs and not included in MicroBridge is a score card in the conventional format. To do so with this particular program would obviously have been misleading.

Unlike Chess, where all the information regarding the strategy of a game is visible at every stage of play, Bridge is largely a game of inference. Both your partner and the opposition must draw whatever information about your hand that they can by the way bidding proceeds and the way a hand is played. The manner in which this occurs is governed by formalised rules governing the process of bidding.

MicroBridge uses the Acol bidding system. Deriving its name from a road of the same name in Hampstead, London, about 50 years ago, the system used by the Acol Club has been adopted throughout the UK as the principal Bridge system used to govern the rules of play.

A bridge goes far



When playing the ▲ computer, the player can elect to be dealer, North or South, or for the hands to be rotated.

At the end of play, all ▶ four hands are displayed. The player can then play the same hand again, or try another hand.

MicroBridge also observes Stayman and Blackwood conventions — subsystems used optionally in the Acol system. The former is a convention used in No Trump bidding to explore the possibility of a better suit. The Blackwood convention is a formalised procedure used when going for a slam.

While the technique governing play is relatively easy to acquire, one of the most important facets of Bridge is the art of concise strategical communication between you and your partner. One of the most difficult aspects of Bridge for beginner and experienced player alike is developing the skill of effective bidding.

MicroBridge is provided with a tutorial which teaches bidding with a series of 16 lessons, each devoted to a particular aspect or theme. Each chapter in part two of the extensive manual corresponds to each of the lessons provided in the tutorial bidding exercises.

Teaching mode

All bids must be legal but MicroBridge will allow you to force silly bids, which can be used for experimental purposes, if you wish to do so.

When up and running, MicroBridge asks if you would like to start with a lesson or a practice session. If you opt for the teaching mode you will be asked to enter one of the 16 lesson numbers devoted to a particular aspect or theme. You will also be asked for a lesson number and a deal number. Having entered that information, you will then be presented with the bidding screen.

The MicroBridge bidding screen is divided horizontally into two windows. The upper window provides information regarding your current hand, icons representing the four suits and values held for each suit, lesson number, deal number, board number bidding information and probably points based on the bids made.

Interaction with the displayed hand is made in the lower window and, whenever a screen prompt is flashing, you have the option of pressing <Q> to query the reasoning which produced the decisions made by the program.

Better bid

If your bid is not successful or if a better bid is possible, you will be advised that your bid is valid, but that a better bid may be made. In some cases, you will be advised that you can force the program to accept your bid by pressing <Z>.

Pressing <SPACE> at any point in either a lesson or actual play will perform the step-by-step bidding automatically; if you are not sure of what bid to make, it will select the most optimal bid possible. Pressing <SPACE> will also go to the next stage in either a Lesson or stage of play.

After completing your bid successfully you are offered the option to repeat the sequence, review the bidding sequence, or complete the bid with the dealt hand.

If you opt to complete the bidding optionally you may enter the bids for your partner or, by pressing <SPACE>, accept bids made by the QL on your partner's behalf. Once that has been completed you may repeat the bidding sequence with the same hand, review the sequence of bidding just completed or go on to the next deal in the lesson sequence.

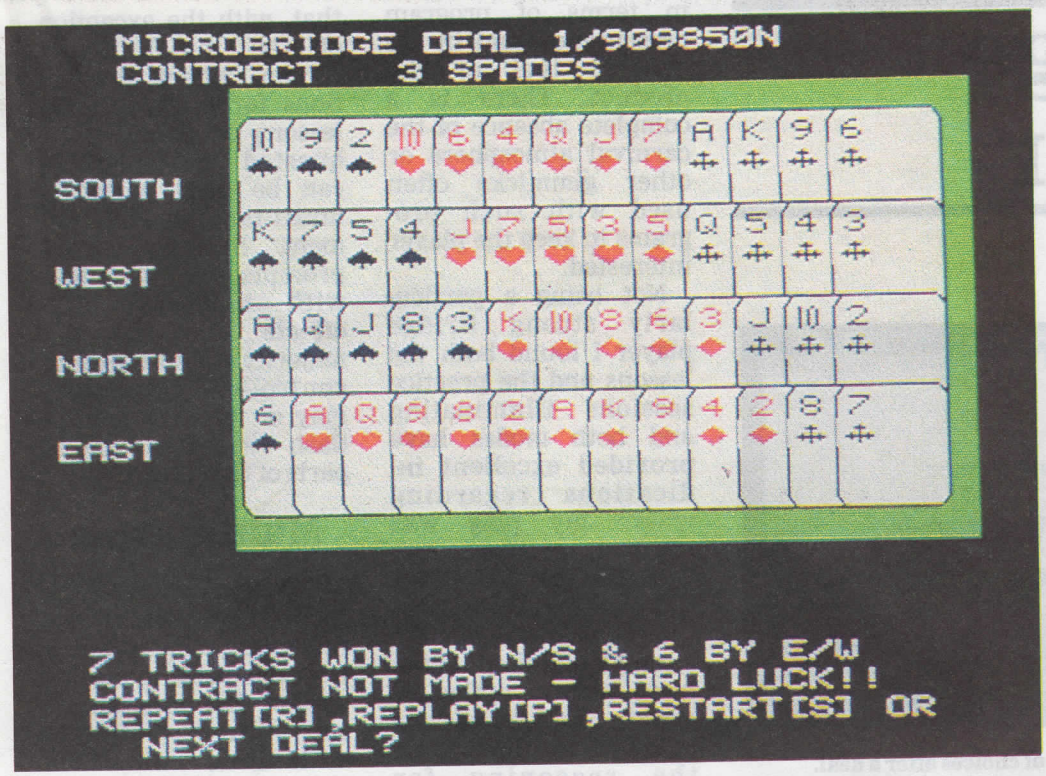
Progression through the range of MicroBridge lessons will provide you with practice in making bids, partner bids and experimental bids. Early lessons also demonstrate how the features of MicroBridge can be used to best advantage.

Each lesson provides several hands, corresponding to specific combinations of cards — referred to as board numbers in the screen information — resulting in different premutations of deals with which to practise. Each of the hands is chosen so as not to anticipate later lessons.

The number of different boards available to the lesson mode vary with the lesson number — see table one.

TABLE 1

Lesson	Number of boards
1 Opening the Bid	26
2 Following through an Opening 1NT	29
3 Other routes to Game after an Opening 1NT	29
4 Responding to Game after an Opening 1-suit Bid	48
5 Continuing the Bidding	63
6 More Opening Bids	63
7 Showing Strength	36
8 The Preference Situation	38
9 The Fit Situation	57
10 Strong Opening Bids	39
11 Following through an Opening 2	62
12 Going for a Slam	35
13 When the Opener Passes	13
14 Odds and Ends	10
15 About Pictures	9
16 The Strong No-Trump	24



Although the 16 lessons have been selected to present the best examples of each type of situation covered by the respective lesson, additional practice may be acquired by not selecting the <P> option at the end of the bidding session, when in the PLAY mode. Game boards will then be presented eiither sequentially or by a specified number.

Hand reading

Perhaps more important than the bidding, MicroBridge also teaches you how to draw information about your partner's hand by the way the bidding progresses through a given hand.

The PLAY mode provides you with a number of options so that you may tailor your game to your particular requirements and interests:

1. Whether you wish to play NORTH or SOUTH.
2. Whether or not you wish to rotate the card deal.
3. The option to have normal or extra strong hands.
4. Input of the name of the NORTH position player.
5. Starting with a particular board number.

You may elect to be North and be the dealer for every play or, as in a real game, elect for the deal to rotate. In either case, your hand alone will be displayed on the screen. If you opted to be the dealer, you will bid first, with the options to devise your bid and key it in or, if you wish, you maypress <SPACE> and the QL will enter your bid for you.

Options three and five are related in that, if you opt for a normal hand, you can have either a specified or a randomly-generated board number. Selecting the option for a strong hand enables you to play game boards in the range of 800,000 to 999,999. Including every possible permutation provided by MicroBridge, you can have millions of hands available.

If you enter <ENTER> in respnse to the prompt for a board number, you also have the option of entering strong or weak No Trumps (NT). Starting with any specified game board, you may either proceed with bidding in sequential hands or, by pressing <P> go on to play the hand with which you have just completed the bidding. Bidding may proceed in either of three ways:

★ You may bid manually, as is done in the lesson mode.

★ You may press <SPACE> and accept the program's bids, step-by-step, also as done in the lesson mode.

★Bypressing <CTRL> <A> at any stage of the bidding sequence, have the bidding entered automatically.

The latter option is particularly useful if you are an experienced Bridge player or wish to practise with an optimised hand. Once the bidding sequence is concluded, the screen will display both Norths and Souths hand, the bidding sequence and the final contract. At that point you can elect to repeat the bidding with the same board number, review the bidding sequence, play the contract, re-start — taking you back to the first screen whereby you can set up different parameters for a game — or go to the next deal.

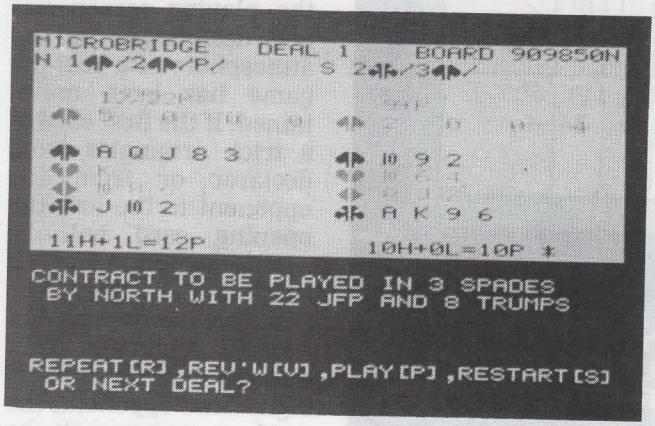
The presentation of the playing screen has been designed so that the atmosphere of a real-life game has been maintained. If the first card of a trick originates from declarer or from the opponent to the left, the opening card will be positioned to the right of the "table" centre.

Where the first card of a trick originates from dummy or declarer's right-hand opponent, the card sequence will be positioned from the left of "table" centre. This feature emphasises visually both the clockwise play of the cards and indicates who has the next play.

MicroBridge is provided with a variety of ways to select cards and cards may be specified in several ways under different conditions:

★ Typing in S, H, D or C, to specify the suit, and the card value.
★ Where there is only one card in the hand or one card in the suit, any keypress will play it.
★ Where it is impossible to follow, and there is only one card in the suit indicated, no further keypresses to identify the card are necessary.
★ When following suit, where the suit has already been identified or where all the cards in the hand are of one suit, pressing either the UP or DOWN arrows will play the highest or lowest card respectively.

A bridge goes far



The player has a variety of choices after a deal.

★ A further ramification of selecting a card with the arrow keys, when a suit is being played for the fourth card, the UP arrow key will play the highest card necessary to win the trick. If there is no other card capable of winning the trick, the lowest card in the suit is the one which is played.

★ If you are following suit and are contributing either the second or third card to the trick, the UP arrow will either:

Play the highest card, even if you are holding a lower card which is higher than the card played so far in the trick.

Play the lowest card, if the part-trick has already been ruffed or if a higher card than the highest available to the player has already been played.

I found the MicroBridge format governing keypresses for entering cards into play somewhat daunting at first but, with a little hands-on experience, the system worked well, was easy to get to grips with and improved the speed of play.

At the end of play all four hands are displayed. You then have the option either of playing the hand again si that you may try another approach, to re-start the same hand beginning at the bidding sequence or go to the next deal.

New game

You can press <ESC> at any time during play or at the completion of a game and return to successive previous stages of the program. By pressing <ESC> three times you will return the first screen from which you may be entering new game parameters.

My first impression of the presentation of MicroBridge is one of professional polish both in terms of program presentation and in the general feel of the product. There is a complete absence of the carnival atmosphere or other gimmicks often used with such programs to keep the player interested.

Not being a particularly strong Bridge player I found both the lessons and the practice sessions illuminating and both modes have provided excellent indications regarding where my play was weakest.

During the bidding the QL continually updates the indication of the strength and shape of the hand, with an option, at certain points of the bidding, to interrogate the reasoning for making particular bids. In this way, the bidder is able to develop a picture

No cheating

of the hidden hands during the auction in the same way as in a real play.

Overall, I would rate MicroBridge with a 10 out of 10. From a point of view of sheer size, it could justifiably be called monumental. Even more important is the fact that it is an extremely useful tool for getting to grips with the complex subject of Contract Bridge.

One of the most important aspects is that it does not cheat. MicroBridge will play the "unseen" hands "dealt" to it only within the framework of a given game. It is ideally-suited for both the lone player, where the QL is allowed to play the parts of both partner and opponent and, by having a live partner playing the same hand on another QL, a real-life playing environment.

Taskmaster users may be interested to note that, with the exception of the initial inpout screen, where the options for setting-up the lessons or play are requested, MicroBridge can be used within a multi-tasking environment. Start-up screen prompts, in common with mode-switching effects seem in the majority of multi-tasking controller programs, may or may not set the flash bits on the active parts of the screen.

Multi tasking

Once the options of the game have been set up, however, the display behaves itself alongside any of the programs I ran with it — mostly with Quill, with which this report was prepared. Although MicroBridge is not intended to be used in such an environment, I often find being able to switch between a report and the product I am reviewing a useful feature.

Although a little knowledge of the basic tenets at Bridge is assumed by the program, beginners can learn sufficient, of the rudiments of Bridge from any number of very good books available on the subject.

Potential new Bridge players may consider looking at two particularly good books on the subject — Alfred Sheinwold's *First Book of Bridge*, published in paperback by Faber. It will take you from the basic elements of Bridge to actual play. The second, Jeremy FLint and Freddie North's *Bridge: The First Principles*, is published by Pan. The book provides numerous examples of the reasoning used to complete a bidding sequence and playing a particular hand.

The QJUMP Pointer Interface

The QJUMP Pointer Interface is the core of our development plans for the QL. This is the new standard in multi-windowing multi-tasking environments. It gives you mouse, cursor key or single keystroke control of your QL. Only QJUMP brings you a completely new environment for your expanded QL, providing non-destructive windows for any well written program (and most badly written ones too!) no menus to set up, no silly limitations, just CTRL C to switch between programs. This is the way forward for QL users, while most software will work with it, the best of the new software coming will not work without it. The QJUMP Pointer Interface makes your QL really work!!

QJUMP Pointer Interface Products

QRAM is the RAM based utilities package designed to get the best out of any QL with at least 256 kbytes of additional RAM. QRAM is the starting point for any Pointer Interface system. The QRAM menus pop up at the touch of a key to provide instant access control of your QL.

The FILES menu can View, Execute, Copy, Backup, Move and Delete files using directories sorted on Time, Date, Name, Length or Usage. The PRINT menu can SPOOL multiple copies of any number of files, with or without page throws at the end. The JOBS menu gives you control over all the jobs in your QL, while the CHANNELS menu allows you to find which jobs are using which devices or files.

It also includes a comprehensive Window and Screen Dump and a superfast dual mode RAM disk and dynamic printer buffer. English or Deutsch.

QRAM	**£29.90 (£26.00 export)**	**Available on Mdv / 3.5 / 5.25**

QIMI is the Internal Mouse Interface from QJUMP. The QJUMP Pointer Interface automatically detects the Internal Mouse Interface so no changes are needed for any programs which use the QJUMP Pointer Interface. QIMI is the only mouse interface which leaves all of the QL's expansion facilities free for other peripherals. QIMI fits right inside the QL and is supplied with tools. QIMI is ATARI mouse compatible.

Battery backup is now available for the QL's Real Time Clock. Not just the simple battery as supplied by others, that was too unreliable for Sinclair to give away. This incorporates a turn-on glitch suppression circuit which has been shown to improve the reliability of "bad" clocks by more than 50 times. Only available with QIMI or as an upgrade to QIMI.

		+RTC
QIMI	**£29.90 (£26.00 export)**	**£39.90 (£34.70 export)**
QIMI+mouse	**£69.90 (£60.80 export)**	**£79.90 (£69.50 export)**
QRAM+QIMI	**£54.90 (£47.75 export)**	**£64.90 (£56.50 export)**
QRAM+QIMI+mouse	**£89.90 (£78.00 export)**	**£99.90 (£86.85 export)**
RTC upgrade for QIMI		**£19.95 (£17.35 export)**

QTYP is a versatile typing checker for all users of the QJUMP Pointer Interface. Check as you type, or run your (almost!) finished document through it as a final check. Pop-up windows advise you of unknown words, suggest correct spellings given partial words, and warn you about difficult words (do they get easier with practise or practice?). You can even use it from within your own programs, for instance to analyse documents for consistent mis-spellings or range of vocabulary.

QTYP is supplied with a 40,000 word English dictionary, which you can extend or edit. Other language and specialist dictionaries can be created to your own requirements using the dictionary editor supplied with QTYP.

QTYP needs the QJUMP Pointer Interface supplied with QRAM.

Until 31 December 1987 Only!!

QTYP	**£19.95 (£17.35 export)**	**Available on Mdv / 3.5 / 5.25**
1988 price	**£29.90 (£26.00 export)**	**Available on Mdv / 3.5 / 5.25**

QPTR is the complete QJUMP Pointer Interface documentation and Pointer and Window Manager toolkit. It includes SuperBASIC and assembly language interfaces, design tools, examples and the latest Pointer Interface and Window Manager. Now you can join the QJUMP Pointer Interface bandwagon in SuperBASIC or assembly language.

QPTR	**£29.90 (£26.00 export)**	**Available on Mdv / 3.5 / 5.25**

Watch this space for more QJUMP Pointer Interface products from QJUMP.

Other QJUMP Products

QJUMP SuperToolkit II. The "clear market leader" (QL World) in Toolkit ROMs. Why buy separate keydefine programs, job control utilities, default directory utilities etc. when QTK II has them all and more? "Jedem ernsthaften QL-Anwender zu empfehlen" (Computer Kontact).

QTK II	**£29.90 (£26.00 export)**	**On ROM / Mdv / 3.5 / 5.25**

QMON II Monitor/Debugger with single line assembler/disassembler, normal as well as conditional breakpoints, trace and backtrace, search, macro commands, transient windows and full window memory editor and much much more. "Das absolute Spitzenproduct" (68000er), can we say more?

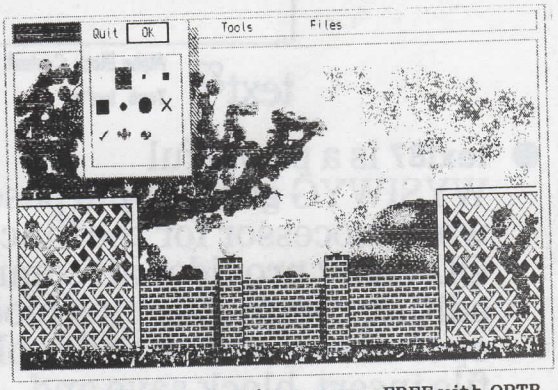
QMON II	**£19.95 (£17.35 export)**	**Available on Mdv / 3.5 / 5.25**

QEP III is the "Rolls Royce" (Sinclair User) of EPROM programmers. Many QLs have been bought just to use QEP III. Programs EPROMs 2716 to 27512, NMOS or CMOS. Features high and low voltage verification. Too many facilities to describe here, it puts £1000 EPROM programmers to shame.

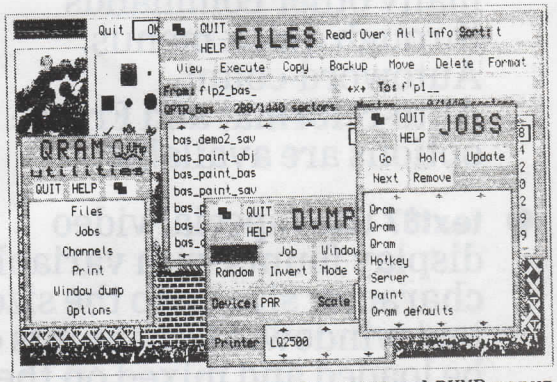
QEP III	**£129.95 (£113.00 export)**

QJUMP can supply floppy disk drivers for those who have been left with unsupported floppy disk systems. Available for Medic (gets round many of the faults on some of the early Medic disk drives) and MicroPeripherals, version 3 or version 5 (provides compatibility with the rest of the QL world and improves performance).

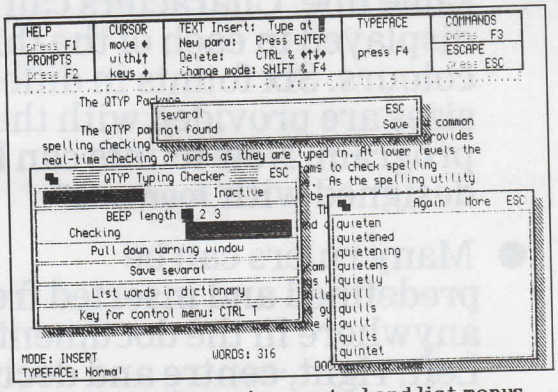
QFLP	**£14.95 (£13.00 export)**	**for Medic, MP ver3 and ver5**



The PAINT demonstration program FREE with QPTR



PAINT and QRAM showing FILES, JOBS and DUMP menus



Quill with QTYP warning, control and list menus

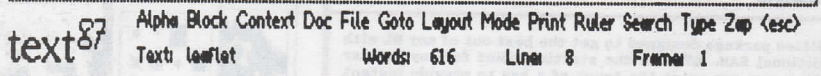
Please add £1.00 post and packing (UK) or £2.00 (Europe). Payment by UK cheque or PO; direct transfer to Barclays Bank, Benet Street, Cambridge. Code 20-17-19, account 30744557; Access / Mastercard / Eurocard / Visa; Eurocheque in Pounds Sterling (<£200) with the card number on the reverse; International Girocheque in Pounds Sterling. Personal cheques drawn on a non-UK bank should be in local currency and should include an additional £3 to cover the bank negotiation fee.

QJUMP

24 King Street
Rampton
Cambs
CB4 4QD
Tel 0954 50800

text87

The Advanced Wordprocessor for the Sinclair QL



- **text87** is a powerful WYSIWYG general-purpose wordprocessor for the Sinclair QL. **text87** provides all common editing commands plus block operations, search and replace, file insert, block save and many other commands through quick menus. Autoword-count, Auto-reformat and Freeze options are available

- **text87** uses special video display founts with variable character size up to the size of text window. Many founts can be loaded and mixed on the same line. Characters can be displayed in each of the three colours. Six founts in different sizes are provided with the program. New founts can be designed with **founted87**

- Many rulers can be predefined and inserted freely anywhere in the document. Left, right, centre and decimal tabs are available. Daisywheel and dot-matrix printers are supported. Micro-spacing, micro-justification, proportional spacing, micro-line-spacing can all be used on most printers. Multiple line headers and footers with variable format plus up to 4 columns can be printed on a page

- **text87** operations are extremely fast even with very large texts (eg searches whole 100K text in 2 seconds). Screen display is more than twice as fast as the QL's own routines. The program is very compact and can be used on an unexpanded QL with its default proportional fount. Any amount of memory expansion can be filled. Texts of up to about 480,000 characters can be edited on a 640k QL

- **text87** is a well-behaved executable multi-tasking program with resizable text window. **text87** is compatible with Spellbound and can import Quill Doc files retaining all the tabs and highlights

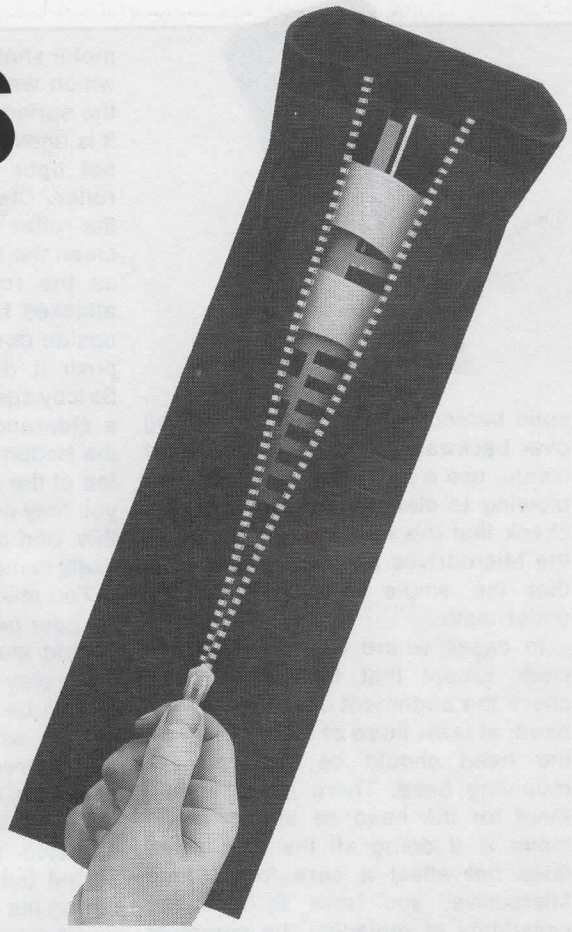
- **founted87** is a display fount editor available at extra cost

---

Prices inclusive of airmail worldwide:text87 £45; founted87 £10

SOFTWARE 87, 33 SAVERNAKE ROAD
LONDON NW3 2JU

Secrets of the inner World



Bryan Davies takes the top off the QL and looks at microdrive maintenance and power supply modifications.

Letters to *QL World* frequently refer, often unwittingly, to the two QL problems which seem to plague users the most — cartridges which cannot be read properly and lock-ups. Here are a few suggestions on dealing with these, as there seem to be many readers who have not heard this previously.

Your mother may have told you not to fiddle with something which is still working. If you are ham-fisted that may be good advice but I find that any QL I see benefits from attention to the drives, even if they are nominally new. A recent letter from a supplier supported this view. The plaintive cry was that "the level of cartridge returns is getting crazy as people's QLs get older." Signs which suggest drives are in need of attention are:

Failure of a newly-purchased commercial program to boot-up, back-up or run. If a replacement cartridge also fails, the odds are definitely that the problem is yours, not the supplier's.

Failure of several cartridges to format; check that there is a write-protect tab in place along the right side, as formatting is not possible without it. Stick Sellotape across the gap if the tab is missing.

A low sector-count when formatting.

One drive giving noticeably fewer sectors than another when cartridges are formatted.

Long times being taken to produce directories or run boot routines.

Before doing any work on the QL, switch off the power; you may not get a shock but you can damage expensive components by poking around with the power still on. The one job which can be done easily, without opening the case, is cleaning the read-write heads to remove tape particles and general dirt from them. If you make frequent use of the drives, this job may need doing every week. Use a Q-tip or cotton bud dipped in a non-violent cleaning liquid such as isopropyl alcohol to wipe the visible surface of the heads gently; they are the clearly-visible silver pieces seen when you look straight into the Microdrive slots.

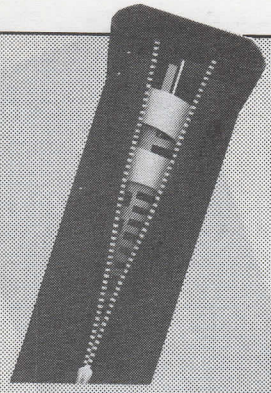
Make sure not to leave small pieces of cotton behind inside the drive enclosure, as they may get into cartridges and cause jamming eventually. Allow the cleaning liquid to dry before inserting cartridges. Note that leaving cartridges in hot or sunny places for long periods may be harmful to the mechanism and to the tape. Leaving them close to a strong magnetic field may result in corrupted files.

Never touch the tape and keep the protective cover on whenever cartridges are not in the QL. Jamming or apparent tightening of the tape inside the cartridge can sometimes be cleared by tapping the cartridge on a table but one jam is likely to be followed by others in time.

Short screws

All other work necessitates removing the QL top casing. Remove the four short screws from under the top edge at the front and the four long screws from underneath the rear — in line with the feet. Do not be afraid to do this but take care not to disturb the works. In particular, do not poke the components on the circuit board — some of them might malfunction if you give them a charge of static electricity — and do not disturb the two ribbon connectors from the keyboard.

If you find some keys are not working after the case has been put back together again, you will have to open it once more and push the ribbon connectors carefully down into their sockets. The top section of the case should be stood upright, just behind the bottom section, to avoid straining the two connectors; put something



solid behind the top to stop it falling over backwards. If there is much dirt inside, use a fine brush and plenty of blowing to clear it. As a precaution, check that the four screws on top of the Microdrives are secure and also that the single ones are directly underneath.

In cases where a drive does not work except that the motor runs, check the alignment of the read/write head; at least three of the four feet on the head should be touching the mounting base. There is no adjustment for the head so do not try to move it. If doing all the jobs listed does not effect a cure for a dead Microdrive, you have to face the possibility of replacing the complete mdv unit at a cost typically of £20-£30.

The two leaf springs at the bottom and either side of the head should be high enough for the top of them to be about level with the bottom of the guides through which the tape runs; the springs can be raised slightly if necessary but be careful with them. The drive motor is supposedly adjustable in position but I cannot see any way you can alter the position significantly, so leave it alone.

The motor is replaceable on its own by removing the two securing screws and unsoldering two wires but the price of a motor may be almost the same as that of the complete drive unit. The leaf spring to the right of the head, alongside the microswitch, should press strongly enough on the cartridge to hold it against the motor drive roller.

Drive roller

Switch on the QL and insert a cartridge in the drive, then Directory or Format it to get the motor running; press the cartridge towards the spring and check that the latter pushes it back again and the drive roller continues to move the tape without any slipping or jittering. Keep the cartridge flat on the mdv base when inserting it, as it is not difficult to get it out of line when the case is open.

Remove the drive roller from the motor shaft by pulling it upwards; note which way up the roller is. Examine the surface which touches the tape; if it is uneven or sticky, or if the roller is not tight on the shaft, replace the roller. Clean the running surface of the roller with the same fluid used to clean the heads but be sparing with it as the roller is soft and might be attacked by the fluid. Turn the roller upside down and re-fit it to the shaft; push it down as far as it will go. Strictly speaking, you should check for a clearance of 0.25-0.5mm. between the bottom edge of the roller and the top of the plastic collar beneath it but you may not have a feeler gauge to do this, and pushing it right down is not likely to make the clearance too little.

Too much clearance is one reason for poor performance; lifting the roller should show just a small amount of free play. The microswitch screw should be checked for tightness. The spring which operates the switch button presses against the side of the cartridge, where the write-protect tab fits; if the tab is in place, the switch is actuated when the cartridge is inserted but, if the tab is missing, the spring fits into the slot in the cartridge and does not actuate the switch. When using Sellotape in place of the tab, it has to be tight across the gap or it will not be strong enough to push in the spring — format failed.

Those who feel adventurous can try swapping the drives if one is not working, to see whether the problem is in the drive or not. Remove the single screw holding the 5V regulator to the big heatsink behind the drives, then take off the sink. Remove the screw from underneath the bottom casing and the two round-head screws from the top of the drive base to release each drive; keep the screws apart from the case ones, as they are of different length — note that they are also different lengths from each other.

The ribbon connectors should pull out from the main circuit board but, if they do not seem inclined to come out, I suggest abandoning this particular check rather than risk breaking connections. Different types of connector have been used for the drives and the earlier type is not easily removed.

The wires on the ribbon connector just push directly into the connector on earlier PCBs and re-inserting them all at the same time is not easy — the wire ends are easily bent and weakened. Later drives had an interlocking notch in the right, front side of the drive base, with a corresponding cutout on the left side; replacement drive units may require a notch cutting off, or a cutout making, before they can be fitted.

There is definitely a difference between some later versions and early ones in the number of sectors given on cartridges. Having damaged a head on a late-model drive, I fitted an early base and head assembly — no notches — and found that I was still getting about 10 sectors more per cartridge than on early drive units, suggesting that the difference does not lie in head assembly. You may manage to obtain just the head/base assembly, which should be much cheaper than buying the whole drive unit, and fitting it is not too difficult. You have to work slowly at the solder joints where the head is attached to the drive circuit board and remove all the solder to enable the base to be removed when the two screws and fibre washers holding the PCB to it are taken out. That will require levering the head steadily from the board, with the soldering iron applied to the joints if you do not have proper de-soldering equipment.

Argument

There is room for argument about how many sectors should be shown when a cartridge is formatted. Sensible people may give you exactly opposite opinions on what is good or bad. My feeling is that a consistently high sector-count is a good sign, not a bad one. Checking dozens of cartridges on a variety of drives has shown me that attending to the drives as described usually results in five to 10 more sectors being available for use on almost all cartridges.

Virtually none of the cartridges I have bought with files already recorded on them has shown a count as much as 220 sectors but equally virtually none has shown less than that after formatting in a drive which has been attended to— 220 is about the value for which to aim. As there are two values given when you ask for a Directory, some explanation is desirable.

The right-hand value xxx/220 is the number of sectors the drive found on the cartridge at the time it was formatted. Some of those sectors may not be in sufficiently good condition to be fit for recording — you will rarely see a count like 220/220 — and the left-hand value tells you how many are available for use. A good average figure is 218/220 for drives and cartridges in good order. Two sectors out of the total on the cartridge are not usable. You should be able to record files on the cartridge until the count

falls to 0/220, although you may have difficulty putting on the last file. Each sector will hold 512 bytes of information/data — half a kilobyte — and 218 sectors is 109K of space, although some space on a cartridge is taken by information about the files on it and there cannot be 109K of user data.

Deterioration of the tape or the mechanical state of the cartridge will be shown by the left value dropping, with the right one possibly staying more or less unchanged. Checking a bunch of recently-formatted cartridges, I found that all except one had differences between left and right values of only 0-3. The cartridges varied considerably in age and usage and three might be taken as a reasonable guide for a cartridge in good condition but you can still use them when the difference increases to five to 10.

Do not trust important files to cartridges showing a difference of much more than five. Do not worry too much if your figures after doing the work listed here are somewhat lower — early drives do not give the number of sectors which some late ones do but I have chekced drives from hardware level D04 up to D15 — this figure is stamped on the underside of the case, the higher the number, the later the date of manufacture — and found the 220 sectors figure to be attainable from them all. The thing to look for is an improvement after you have done the work and consistency between cartridges and drives.

Some QLs were manufactured late in the Sinclair Research story and give significantly more sectors on cartridges. I have a JS QL made by Samsung in Korea which consistently produces counts of 230-240. The hardware level on this is SG18, which may equate to D18 in Sinclair terms; the latest number I have heard for U.K. production is D17. As cartridges formatted on this machine appear to give no problems on earlier machines, I now format all cartridges on it to get more sectors; the available space can jump 10-20 sectors on the pre-recorded Psion cartridges which are commonly on sale at present.

When work on the drives is completed, run them with the case open and check that Format and Directory work properly before the case is screwed together. One prime reason for mdv2 failing, rather than mdv1 is the lack of bracing between the two sections of casing, particularly at the right end. Look at the front edge of the QL; the chances are you will see a

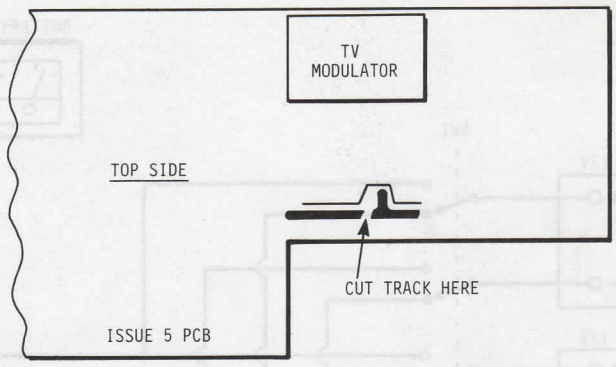


Figure one: track cuts on the top side of an Issue 5 PCB.

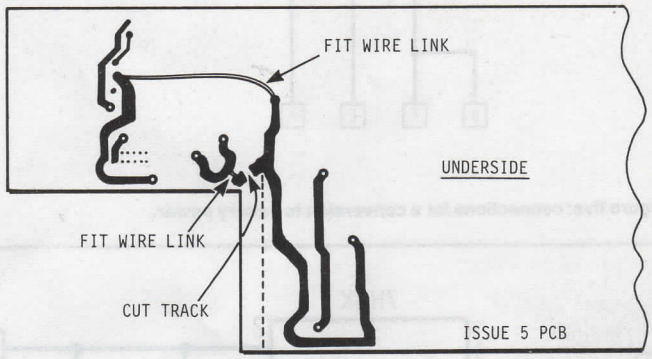


Figure two: track cuts on the underside of the same PCB.

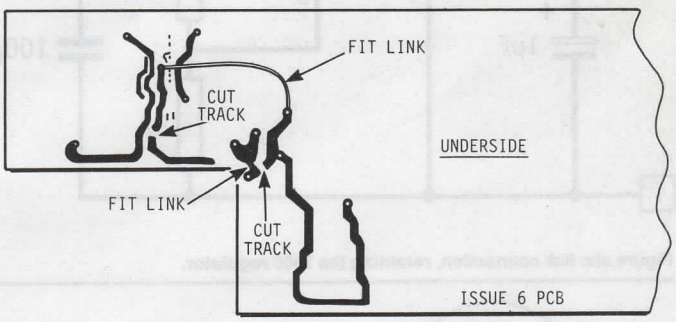


Figure three: track cuts on the underside of an Issue 6 PCB.

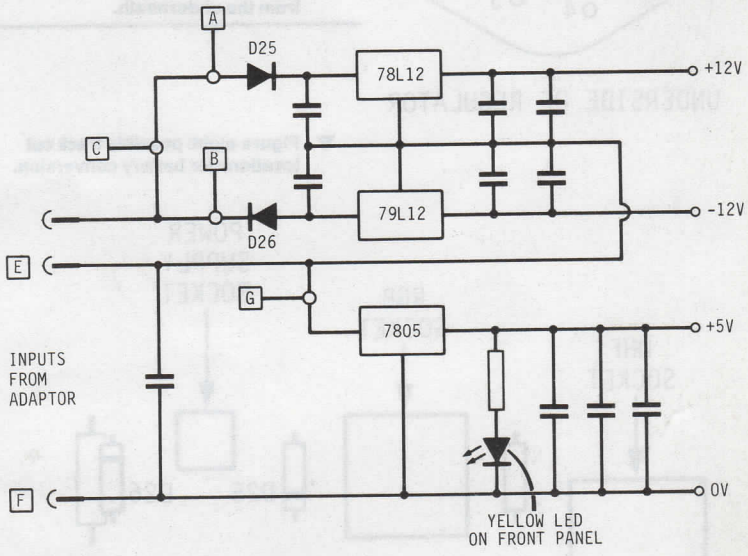


Figure four: track cut, retaining the 7805 regulator.

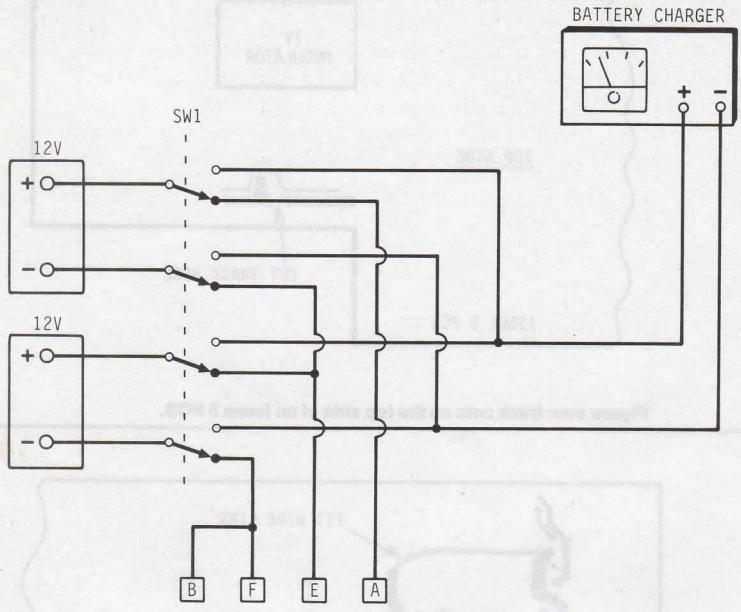


Figure five: connections for a conversion to battery power.

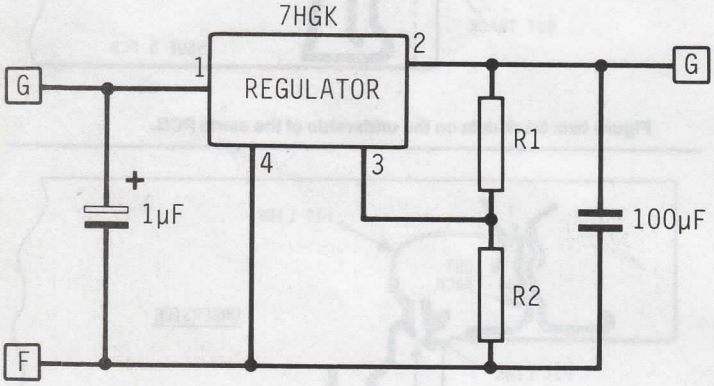
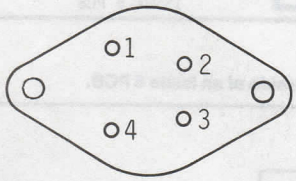


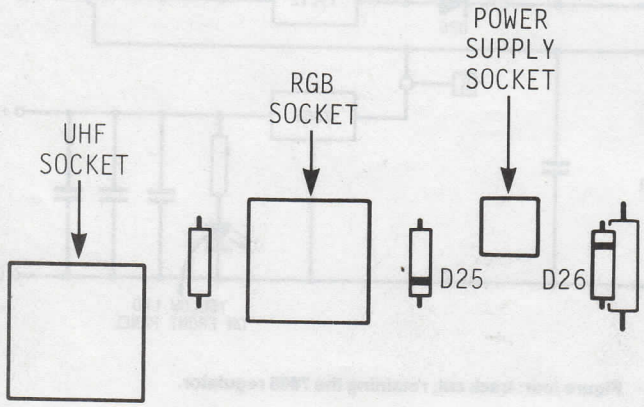
Figure six: link connection, retaining the 7805 regulator.



UNDERSIDE OF REGULATOR

◀ **Figure seven: the 78HG(K) seen from the underneath.**

▼ **Figure eight: possible track cut locations for battery conversion.**



distinct bow shape, with the middle sagging and the ends stuck up. That does not matter much to mdv1 but it can cause the mdv2 aperture to be at an angle to the drive unit at the right end.

You may find that cartridges which do not run properly when the casing is on work normally when it is taken off. If that is the case, the offical modification is to fit a plastic spacer under the screw at the end of the side spring, on mdv2, to prevent the top casing bearing down on the top of cartridges. As the spacer is not generally obtainable, stick a small washer to the upper edge of the bottom casing at the location of the right-most securing hole along the front edge; it also will raise the top casing a little above the cartridge. This is not guaranteed to solve problems with mdv2; it is desirable to look into the mdv2 aperture first and see if anything appears out of line between the aperture and the drive unit.

It is possible that inserting a washer could make matters worse but I have found it to do some good. As a general check of both drives and QL, use the Sinclair System Test 2 program. This checks keyboard, screen, sound and port functions, as well as checking both drives.

There is an electrical modification which can be carried-out to improve Microdrive performance. I cannot say what it is aimed at achieving but it is fairly straightforward to do and should be done by anyone claiming to be capable of using a small soldering iron. Many QLs have been modified in some way and it pays to check what has been done before pulling out the main PCB. This particular modification can be spotted without the PCB being disturbed if the later is Issue 5 but Issue 6 boards have to be removed to spot the change.

Underside

You have to remove mdv1 to look for the modification. Unfortunately, the issue number is marked on the underside of the board but you can distinguish between them by the presence or absence of two components near the middle of the PCB. The Issue 5 PCB has a variable capacitor — TC1 — which is a round can about 1 cm. across with a screw sticking up from the middle; it is next to the left-hand connector for the keyboard ribbon cable and between that and a 14-pin IC socket — for IC17. The Issue 6 PCB has neither TC1 nor IC17. The modifications are shown in figures one, two and three; one and two are for Issue 5 PCBs, eight is for Issue 6.

Use thin insulated wire for the bridges. Some Issue 5 boards have been modified, presumably by Sinclair, in a way not mentioned in the service manual; when there is already a wire link, possibly accompanied by a few components in the area shown in figure two, do not make the modifications shown in figures one and two. If your QL is marked D16 or later underneath, the modification should have been incorporated at the factory during production.

There are three clearly-visible 5V regulators in the QL — one behind each Microdrive assembly — and one in the middle of the large heatsink — the finned piece of metal behind the drives. It is the latter one which is likely to give you trouble. The external power supply produces about 9V DC and the chips require only 5V, leaving the regulator to dispose of 4V, which it does in the form of heat. As the heatsink is situated just under the top casing, with only a few air slots at the front and rear to provide ventilation, it is not surprising that it becomes very hot.

Apart from deterioration in performance of the regulator, the effect of excess heat can be to cause Microdrive problems; the cartridges are only a few centimetres away from the heatsink and, if they are running a good deal during a heavy Quill session, the tape can become too hot for its comfort. This was almost certainly one of the main sources of trouble when the early Psion versions were in use, as they required much more activity of the drives than the later versions do.

The 7805 regulator fitted originally has a current supply rating — 1 amp — which is sufficient for the QL but it appears to become inadequate when an interface is fitted; this is a point which can be argued as some interfaces may not cause trouble but lock-ups are a sign that there is trouble with the 5V supply and you may not have a lock-up until you fit an interface.

Interfaces do not use the 5V from this regulator directly but they use the same 9V from the power supply and effectively increase the load on this to an unacceptable level. A 7805 can vary a good deal in current rating and the designations are confusing, so make sure any replacement is the highest-rated type you can get in the TO220 configuration. The type used for the drives may be only 0.5 amp whereas one and half to two amps is needed on the heatsink.

As a belt-and-braces approach to inconsistent QL performance, try doing some or all of the following: Replace the 5V regulator on the heat sink or if you have another 7805 use a longer screw and fit it directly above the existing 7805, pushing its leads into the same connector. Fit a spacer between the securing holes of the two regulators to keep them parallel and pressing against each other. Or fit a 78S05, which is the same size but is rated at 2 amps, or an LM340T5/7805, which also is the same size but is rated at 1½ amps.

Apply heat-conductive compound to the mating faces of regulator(s) and heatsink.

Drill some holes in the top casing directly above the heat sink. This can be very effective in reducing the operating temperature of the regulator and must contribute to keeping the chip bias voltage at the correct level — the 5V should not vary by more than ±0.25V. A grid of about 7 by 17 holes, 3 or 4mm. in diameter, centred over the heatsink, is sufficient. The case has to be opened if only to remove the material drilled out; it is more convenient if the top casing is removed altogether but, if this is done, be very careful removing and refitting the keyboard ribbon connectors.

Small slice

Do not bend the ends by pressing too hard when inserting them. If some keys will not work afterwards, even when the ribbons have been pushed down into the connectors, it is possible to cut a small slice from the end of a ribbon to give better contact but there is a limit to how much can be taken off and still allow the case to be opened easily.

Note where the LED wires fit in their connector before removing them; from the rear of the QL to the front, the order of the wires should be from power LED — red, black; from mdv1 LED, white, black; from mdv2 LED, grey, black. The blacks are all 0V. To get the wires out of the connector, pull the black connector casing upwards to release the ends of the wires. To re-fit the wires, insert them into their sockets, hold them there, press down the black casing until it touches the PCB.

Some users have tackled the heat problem by removing the heatsink and regulator from the QL, putting them on three extension leads. This will certainly improve the heat dissipation but may make it rather inconvenient to move the QL around. If you are satisfied to have the heatsink outside the QL it is probably worthwhile using a larger one and fitting a higher-capacity regulator and heatsink such as the 78H05 — in a T03 can.

Fit two 0.01 microfarad capacitors between the middle and each side terminal of the 5V regulator. This is worth doing regardless of which type of 7805 is used. The capacitors can be soldered direct to the leads.

Refer to figures four, six and seven. Another way, courtesy of A. Mifsud of Malta, of relieving the strain on the 5V regulator is either to replace it by or put it in-series with a higher power regulator. The 78HGK/78HG regulator is suggested, being a 5 amp type and having a variable 5-20/24V output. If the 7805 is retained, cut the PCB track at "G" — figure four — and connect the output of the 78HG — "G" in figure six — direct to the 7805; otherwise connect the output direct to the 5V line on the output side of the 7805.

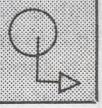
The output of the 78HG is set by resistors R1 and R2; for varying the output a 10 kilohm potentiometer can be used instead. Obviously, R1/R2 have to be set to give the voltage on which you decide but the 7805 needs about 7V input to work properly and a safe figure is about 8V; this is 1V lower than the Sinclair power supply gives, and the resulting temperature on the QL casing will be about 4 degrees C lower.

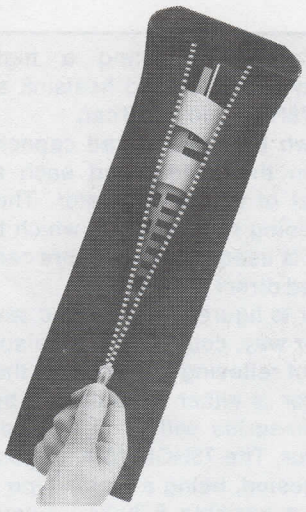
The underside of the 78HG(K)is shown in figure seven. Note that this method removes the need for the 9V input to the QL from the external power supply but does not eliminate the need for the 15V AC — you have to keep the power supply connected. I have not tried this circuit but it looks sensible to me and it works for Mifsud. Do not forget to fit a heatsink to the 78HG(K).

More extreme but useful in some cases is a conversion to 12V supply. This makes the QL immune to mains-borne interference and failures of the mains power. This suggestion, again by Mifsud, may well appeal to users in countries which are hot and have unreliable mains supplies.

There is also the possibility of reasonable portability, at least when you have a car to carry the batteries. The arrangement of two batteries is shown in figure five. The batteries do not have to supply much current and can be ones discarded from motorcycles. The switch enables the batteries to be connected in parallel to a 12V charger or to the QL.

To connect to the QL, cut the PCB tracks or unsolder the diodes at "A" and "B" — figure one — and connect





from "A" and "B" — figure two — to these points. Alternatively cut at "C" and make the same connections — all three existing input connections on the power socket can then be used.

This removes the need for the 15V AC from the external power supply. Connect the "E" points — originally the AC input. Connect "F" and "B", as the original ground reference for the 7805 regulator now has to be the low end point of the batteries. Again, I have not tried this circuit but it makes sense to me and Mifsud uses it successfully. Figure eight shows where to look for places to cut the tracks on the PCB.

If interfering with the QL PCB does not appeal to you, you can put a 12V regulator in the two lines which, supply 9V from the external power supply normally — dispense with the power supply, get a 12V battery, and make yourself a regulator circuit with sufficient capacity to take the full 12V from the battery and reduce this to a value suitable for input to the QL, say 8V.

This will necessitate either chopping the connector from the power supply lead or finding another one the same — they are not a common type. The circuit is as shown for the 78HGK in figure six and the output is fed to "E" and "F" in figure four. You lose the 15V AC supply doing this and that means the serial ports will not have a 12V DC reference supply, but this is not usually needed for connecting a printer.

Car dashboard

One suggestion, courtesy of Dennis Briggs of Adman Services, is to use a regulator from a car dashboard; instruments typically are fed by a regulator giving 6-10V but you would have to make sure that the output was high enough to guarantee 5V from the 7805 in the QL.

It should be possible to reduce the power supply 9V output to 7-8V at the power supply, rather than in the QL. The power supply becomes hot also, especially when an interface is fitted to the QL; I measured the temperature on the casing at more than 40 degrees C after fitting an interface and promptly drilled large ventilation holes all over the power supply casing. If you do this, take off the casing first, as there are components directly underneath the top of it. I also mounted it on thick rubber buffers.

These measures reduced the temperature and noise considerably and may have helped keep the supply to the QL more stable. This leads to another possible solution, one which may work without doing any of the foregoing operations. Adman Services now offers a replacement power supply — £15 plus post and packing — which has a lower voltage output for the 5V regulator, with a resultant drop of temperature on the QL casing of about 4 degrees C. This supply also provides AC output needed for generating the 12V DC used by the ports. The operating temperature of the supply seems to be somewhat less than that of the Sinclair supply, probably because the construction and heatsink are better.

Do not disconnect the 15V AC coming from the power supply except when the 12V battery circuit is used as this is needed to generate ± 12V DC for the serial and expansion ports, although this may not be needed by your printer.

Heating problem

The heating problem may also affect your interface. This probably has a similar 5V regulator inside it and the heatsink used will be fairly small. There should usually be no need to pay attention to this regulator but it is worth thinking about if you have difficulties which seem to relate to the interface rather than the QL. Putting heat-conductive compound on the regulator is worthwhile, even if you are not aware of any problem. Where there is space on the interface PCB, fitting a larger heatsink might be worthwhile. Use of the replacement power supply mentioned brings down temperature on the interface as well as on the QL.

This may be a related problem to the 5V one, insofar as one of the commonest manifestations of interference, lock-ups, seems to become much more prevalent after an interface is fitted. My impression was that overheating associated with the 5V regulator led to lockups on my first QLs, which had no interface fitted.

Originally I tackled this by directing a fan at the right end of the QL during hot weather; it worked well. After an interface was fitted, the lock-up rate soared and the problem had to be tackled with some urgency, as not much paying work was being done during the brief, lock-up free periods.

Work on the regulator on its own did not prevent lock-ups occurring, although the frequency was reduced.

Any flashes across the screen should be investigated. Whatever caused the flash needs suppressing. It will not necessarily be a high-current device, either; swtiching off my # 2 QL produces flashes on the screen of the # 1 system nearby, in spite of all my efforts to suppress everything. On occasion, the good system re-sets when the other one is switched off.

The Sinclair QL service manual and the System Test 2 program can be obtained from various QL suppliers. Check the advertisement pages for them and for replacement QL components. The book is rather expensive — £20-£25, but is useful to users with some knowlege of electronics.

All the suggestions and opinions here are personal, although some are confirmed by what is said in the Sinclair QL service manual, or by comments made by other users. Not being an electronics expert, I have relied on common sense and information supplied by other people; if you have any observations to make, send them to Trouble Shooter at QL World and further comment can than be made in the column.

Information

QL service manual and service test program, replacement power supply, 5V regulators, Microdrives, most QL spares:

Adman Services, 53 Gilpin Road, Admaston, Telford, Shropshire TF5 0BG. Tel: 0925 55895.

Suppressor plug and adapter:

Tony Firshman Services, 12 Bouverie Place, London W2 1RB. Tel: 01-724 9053.

Microdrives, service manual:

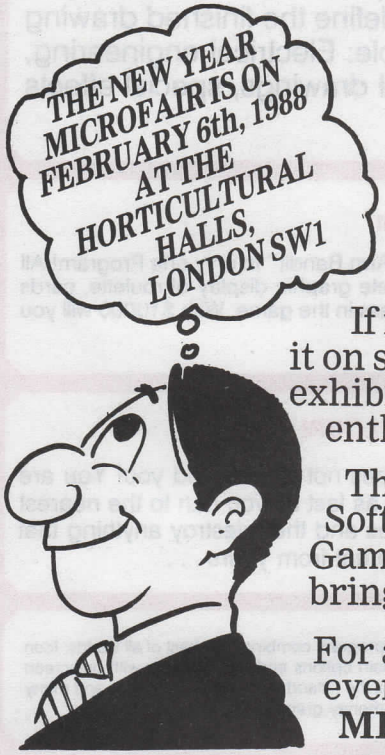
TK Computerware, Stone Street, Stanford, Nr Ashford, Kent TN25 6DF. Tel: 030381 2801.

Varistors, suppressor plug, 5V regulators:

Electromail, PO Box 33, Corby, Northamptonshire NN17 9EL. Tel: 0536 204555.

A SPECIAL MESSAGE TO ALL THOSE PEOPLE WHO HAD A SINCLAIR COMPUTER FOR CHRISTMAS

(and those who have had one for years)



Looking for great gizmos for your new Spectrum or QL? There's one place you will find everything: THE MICROFAIR

If it's new it will be on show. If it's original you'll find it on sale. If you need advice you only have to ask the exhibitors. If you want to meet thousands of enthusiasts, just come along and enjoy yourself.

There's everything for Sinclair Computers. Hardware, Software, Books, User Clubs, Programming Aids, Games, many at special 'show' prices — there's even a bring and buy sale.

For a fun day out and a chance to see and buy everything new and exciting . . . you won't beat the **MICROFAIR**

THE NEW YEAR MICROFAIR

FEBRUARY 6th, 1988

AT THE HORTICULTURAL HALL, GREYCOAT STREET/ELVERTON STREET, LONDON SW1 — 10 am-6 pm

ADMISSION: £2.00 (Adults) £1.50 (Kids under 14 years)

SEND NOW FOR REDUCED PRICE ADVANCE TICKETS

Send to Mike Johnston (Organiser), Dept Q.L.

ZX MICROFAIRS, 71 Park Lane, London N17 0HG
Please send me advance tickets
(Adult @ £1.50

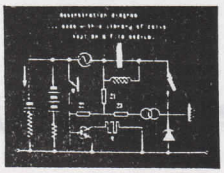
Please send me advance tickets
(Child under 14 @ £1.00

Name .....
Address .....
.....
.....
.....

26th ZX MICROFAIR

Please include a stamped self-addressed envelope and make cheques/POs payable to ZX Microfair

PYRAMIDE



THE DESIGNER: DRAW WITH CONCEPTS!!

The Designer is not just another graphic drawing program for the QL, because the way of drawing is completely new: You first define basic shapes with the classical drawing functions, but then you can use them as many times, at the size, at the angle, at the position, at the colour you wish to create a new drawing! You can even define the finished drawing as another shape. The applications are multiple: Electrical engineering, easy setup of Diagrams, mechanical/technical drawings, special effects for artwork and many more!

SUPER CROUPIER: THE ULTIMATE CASINO SIMULATION!

Play Roulette, Baccara, Poker, Carta Alta, Blackjack and "One Arm Bandit" in only one Program! All the games loaded in memory (128K!) at the same time, complete graphic display of roulette, cards and slot machine. There is even a graphic display of your progress in the game. With $10000 will you be able to beat the computer which is a very good gambler?

MISTER SMITH CHALLENGING ARCADE IN FULL COLOUR!

You don't like paying taxes! You hate work! Your wife does not understand you! You are bored with your mistress! Your friends annoy you! So run as fast as you can to the nearest quiet corner . . . to dream. You are the king of the bubbles and they destroy anything that gets in your way. Maybe Mister Smith's dream is not different from yours . . .

NUCLEON: A utility Package with drawing, music, window, icon and text. This software comprises a suite of programs and tools (on two Microdrives) designed to reduce the labour involved in producing professional results in your own creations. Through AUTOMATIC code generation 100% Creativity and 0% Coding!

QL PEINTRE: This drawing program combines the best of all worlds: Icon driven for fast selection of main options and Help window with on-screen instructions of every stage. All the "standard" graphic functions and many more . . . The best value-for-money graphics package for the QL!

BAG OF TRICKS 1 AND 2: It consists of programs (games, utilities, basic keywords and more) coming on two cartridges plus a QUILL file explaining the use of each and on which you can find a newsletter as well. Some names: MINI-PAC-MAN, SNAKE-BYTE, QUICK-CLONE, SCREEN-COMPRESS and much more!

GRAPHIC TOOLKIT: Seventy new SuperBasic instructions written in 100% Machine code which will enhance greatly the graphic capacities of your QL. Some of the demo programs are by themselves worth the price of the whole package! Here some keywords: SHRINK, PAINT, GRID, STORE, PLACE, COMP, MAG, ROTATE.

WANDERER: For the first time, a game which uses the full power of the QL. Spatial effects, combined with fast animation. The objects will LEAP out of the screen! "Cult Game", "The only game worthy of the arcade tag", *Sinclair User*, "Undoubtedly one of the best games released for the QL" *ZX Computing*.

VROOM: A new challenging car race for the QL with fast colour graphics and real racing circuits. See your car progress on the map, don't leave the track or you will crash into a barrier. Smoothly scrolling background, realistic noises! "Another HIT for PYRAMIDE", *Sinclair User*.

MORTVILLE MANOR: Mystery adventure game! Begin your investigation in a setting consisting of more than 85 full colour screens. The greatest danger of Mortville is its deadly charm; a house 'calm' in the eye of the storm. The first real graphic adventure for the QL! Supplied on two microdrives.

QL OTHELLO: The ultimate Othello-Reversi game. Beautiful 3D representation of the board. 9 levels of play. Easy editing of the current game. On-screen help. Your Move! Watch out . . . "You would be hard pushed to find a better version of Othello on ANY MICRO", *QL World*.

PYRAMIDE ORDER FORM

☐ MISTER SMITH	£11.95	☐ THE DESIGNER	£14.95	☐ SUPER CROUPIER	£12.95
☐ BAG OF TRICKS 1 & 2	£11.95	☐ NUCLEON	£14.95	☐ QL PEINTRE	£12.95
☐ VROOM	£12.95	☐ GRAPHIC TOOLKIT	£12.95	☐ WANDERER	£14.95
		☐ MORTVILLE MANOR	£14.95	☐ QL OTHELLO	£12.95

NAME _____

ADDRESS _____

PYRAMIDE SOFTWARE

86 COMMERCIAL RD., PADDOCK WOOD, KENT. TN2 6DT. TEL: 089 283 2952

★ FREE TRANSFORM BOX *For The First 50 Orders Received*

Worth £4.95. Offer 1 month from publication date

LIBERATE YOUR QL!

Q_ LIBERATOR BUDGET COMPILER £29.95

Budget price but not budget specification! This is a full function easy to use compiler that converts slow SuperBASIC into a fast multitasking job without fuss. Its compact design and unique 2 phase operation allows large compilations on 128k systems. Assembler subroutines can be linked to compiled object code. Supplied with free toolkit routines to provide full error trapping (even in interpreted programs!) and job control.

"24k of pretty rough SuperBASIC and it compiled first time"
—QUANTA April 1987

Q_LIBERATOR RELEASE 3.2 £59.95

For the committed enthusiast with expanded memory, Q—LIB 3.2 is the ultimate SuperBASIC development system. Faster all round than the budget version, Q—LIB 3.2 has advanced facilities to support modular program development. Add your own resident procedures or functions to SuperBASIC without the need to learn assembler!
Q—LIB 3.2 is controlled by a mouse or keyboard driven menu system with full online help to describe the many compiler options. For QRAM users, Q—IB programs can be hotkeyed and ONLY Q—LIB 3.2 can correctly compile programs which use the new QPTR environment.
Other enhancements include ★ Direct compilation from QLOAD files ★ OVERLAYS (temporarily loaded procedures) ★ GLOBAL variables ★ Integar FOR loops and utilites to produce ROM based toolkits or auto EXECing programs.

"Features are simpler to use with Q—Liberator"
"Extra facilities and virtually complete compatability"
— QL World Sept 1987

Q_ LIBERATOR ON ROM £75

The Q—LIB 3.2 nucleus is now available on a 16k EPROM cartridge to give the fastest possible runtimes. Essential for 128k users who want the facilities of 3.2. Those wishing to create entirely ROM based systems can obtain Q—LIB 3.2 on a 64k ROM. A suitable card to hold three 64k ROMS is available for .55.

QLOAD

Tired of the irritating stop-start way in which SuperBASIC programs load? Then you need QLOAD. QLOAD loads and saves absolutely any BASIC program reliably and fast on any medium. An average program QLOADS in a few seconds — with really large programs the time saved is incredible. Simple operation via the new procedures QLOAD, QSAVE and QLRUN. No side effects, no restrictions, no excuse for not buying it at this ridiculuous price!

"Has reduced loading time to a very impressive level"
"Using QLOAD is extremely easy and uncomplicated"
— QL World August 1987

QREF

QREF is an enhanced cross reference utility for SuperBASIC. QREF prints tables showing all line numbers where selected procedures, functions or variables are referenced. Because QREF is RESIDENT and INTERACTIVE, its facilities are always instantly available when debugging. The wild card selection of names lets you cross reference anything from one variable to the entire ROM. As a bonus, there's a FIND command for the SuperBASIC editor and a command to reveal the start address of machine code procedures.

"An invaluable utility"
— QL World August 1987

QLOAD AND QREF TOGETHER £9.95

(Last chance at this price)
Upgrades Budget to QLIB 3.2 £30 or £45 for ROM
2.x or 3.x to 3.2 £10 or £20 for ROM

SAE for further information. Please specify flp or mdv when ordering. Prices valid for all Europe. Send UK cheque or PO to:

Liberation Software

43 Clifton Road, Kingston upon Thames KT2 6PJ
Tel: 01 546 7795

Mail order only

SEE US AT THE MICROFAIR

Liberator

Q Liberator 3.2

The Ultimate SuperBASIC Development System

GAP SOFTWARE (17 ST. JOHN'S TERRACE LONDON E7 8BX) 01-552-5452

FRONT PAGE EXTRA! 2

All the features of FPx,plus high-resolution fonts in sizes from 8x8 dots to a massive 64x56! Use the whole page - no screen restrictions! FULL 96 character ASCII sets! Fully redefinable! Save your own! Four sets supplied from 12x8 (like this one) to 32x32!

OFFICE JUNIOR

NOT A 'FRONT END'!
NOT A 'TOOLKIT'!
This is a collection of USEFUL utilities!

JOIN AND SHRINK '_doc' FILES-Save around 35% in storage space! Great for archiving files!
CONVERT FULL COLOUR SCREENS to monochrome for use with FPx2, b/w printers, even DTP!
FONT DESIGNER-gives standard QL fonts!
SCREEN TRIM-to cut screens down to size!
SAFE FORMAT-checks for files before formatting!
AND MORE! FULLY COMPATIBLE WITH THE SMILING HOUSE!

SMALL TRADERS!

If you need Purchase and Sales ledgers, Stock Control, Mailing list, cash AND credit entry, registered or not for VAT, handling the new cash-accounting VAT method, and you don't have time to learn accounting, could live with a completely menu-driven accounts program, and have £25 to spare...(wheu!) the SMALL TRADERS PACK MAY IMPRESS YOU! The INVOICER module is another £10 if bought at the same time (£15 if not), and integrates with the main package.

SMALL TRADERS PACK from SD MICROSYSTEMS

YOUR TIME IS VALUABLE, SO OUR SOFTWARE IS EASY TO LEARN, EASY TO USE, AND EASY TO AFFORD!

PRICES

FRONT PAGE 1.05	£ 22.50	TASK SWOPPER	£ 19.95	MP 165 PRINTER	£238.00
FRONT PAGE EXTRA/2	£ 39.95	TASKMASTER	£ 25.00	SCHON KEYBOARD	£ 54.00
OFFICE JUNIOR	£ 20.00	EYE-Q	£ 29.95	TRUMP CARD	£200.00
FP to FPx/2	£ 30.00	QRAM	£ 30.00	SMILING MOUSE	£ 40.00
FPx to FPx/2	£ 10.00	QLOAD/QREF	£ 10.00	10x3.5"(library box)	£ 20.00
FP to FP1.05	£ 4.00	SPELLBOUND	£ 29.95	40x3.5"(locking box)	£ 80.00
OFFICE JUNIOR+MOUSE	£ 60.00	QLIBERATOR	£ 60.00	3.5"library box (10)	£ 2.50
SIGN DESIGNER	£ 17.50	MDV cartridges (10)	£ 16.00	3.5"locking box (40)	£ 12.00
SMALL TRADER'S A/C	£ 25.00	INVOICER	£ 15.00	APT ADVENTURE SYSTEM	£ RING

** RING FOR PRICES FOR PAPER, PRINTER RIBBONS, SCREEN CLEANER, LABELS, ETC. e.g. mdv labels £3/100

★★FRONT PAGE CLUB★★

FREE, INTERMITTENT AND INTERESTING NEWSLETTER! 20% OFF GAP STUFF! ABOUT 10% OFF OTHER STUFF! JOIN NOW AND START SAVING! ONLY £15 FOR A YEAR!

EXCLUSIVE DISTRIBUTOR IN USA:
SHARPS INC., RT 10, BOX 59, MECHANICSVILLE, UA 23111
EXCLUSIVE DISTRIBUTOR IN SWEDEN:
TM ELEKTRONIK, BOX 79, S-701 21 BORLAHGE
DISTRIBUTOR IN W. GERMANY:
PHILGERMA, UNGERERSTRASSE 42, 8000 MUNCHEN 40

This advertisement was designed, and printed using Front Page Extra/2. Most of the character sets are available in the program as bought. The advert was printed using an MP165 printer. (Only £238 inc QL interface, VAT, p&p)

The Front Page series and Office Junior have been compiled using QLiberator by Liberation Software.

Data-Skip presents...Seiko RC-1000, Wrist Terminal

JOE BROWN 213-123-4567

MEETING 335 10/15 A10:30

DANCE LESSON 5 FRI P06:00

FRANKFURT AM 02:08 42

84 10/14 A SUN 10: 08 42

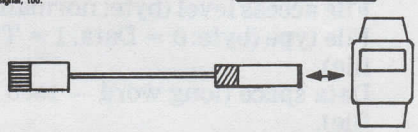
Memo Function. Can be used to store telephone numbers, client lists, schedules input from a personal computer. There's no limit to its uses. Data entries have a maximum length of 24 characters, and can be output on the watch display whenever, wherever you wish. The Memo function is the heart of the Wrist Terminal.

Schedule Alarm Function. Input the month, day, hour, and minute, for schedule entries and your Wrist Terminal alert you when the date and time come by beeping and displaying a twelve-character message on the screen. Invaluable for the businessman, of course, but the Wrist Terminal can also remind you of special personal days, for example, birthdays or anniversaries, that are so embarrassing to forget.

Weekly Alarm Function. Tuesdays at 9:30 there's a meeting, Thursdays at 7:00 you go to your sports club, Fridays...The Weekly Alarm function is just the thing for today's busy people. Input the day of the week, hour, and minute, and each week at the proper time the Wrist Terminal will beep and display a twelve-character message to remind you.

World Time Function. What time is it now in London? New York? Just input the time differences and afterward you can know the time anywhere in the world, instantly, with this internationally oriented function. Be sure to input the place name, too, in up to twelve characters.

Watch Function. The Wrist Terminal has a full set of Time Keeping functions, including a built-in alarm which will beep at the same time each day and a calendar which will automatically tell you the year, month, and day accurately from now until the year 2020. It has an hourly time signal, too.



The Seiko RC-1000 is a wrist-terminal with 2K of free memory to store addresses, telephone numbers etc. (max. 80).

Also has extensive alarm-facilities. Fully programmable on your QL. Data-transmission via Ser-1 port.

Complete package (containing Transmission Software, interconnecting-cable and Watch)

Now only..... £49.95

(Also Spectrum/interface I/IBM PC versions available. Please state)

Please add £1 for P & P. Orders: send us a cheque or postal order.

(No Visa or C.O.D.) made payable to:

DATA-SKIP, OOST Haven, 58, 2801 PE Gouda, Holland
Tel: 1820-20581

DIY TOOLKIT

Each month Simon Goodwin adds new commands to the QL repertoire. This month he edits file header parameters.

Every QL file includes a header which contains details of properties of the file which are not part of the data. It is very useful to be able to read and alter disc and tape file headers but commercial toolkit programs like Turbo Toolkit and SuperToolkit are short of such facilities.

A QL file header consists of 64 bytes of data, although some parts are often blank. Sinclair reserved space for all kinds of details but an unexpanded QL leaves zero bytes in some places; for instance, a standard QL does not record the dates when files were last used, although most disc systems keep track of that information.

Table one shows the meaning of each of the 64 header bytes.

Table one

Byte	Meaning
0-3	File length (long word: number of bytes of data).
4	File access level (byte: normally zero).
5	File type (byte: 0 = Data, 1 = Task, 2 = Link file)
6-9	Data space (long word — zero unless a task file).
10-13	Extra information (long word — normally unused).
14-15	Length of file name (word, 0 to 36).
16-51	File name (up to 36 bytes of ASCII text).
52-55	Data file was last changed (long word).
56-59	Data file was last read (long word, often blank).
60-63	Date file was last copied (long word).

The command GetHEAD lets you read a file header. It lets you check the file length and the dates when the file was last read, changed or copied. SetHEAD lets you change the dataspace of a task or the file-type or other reserved information.

The commands have two parameters — a channel number and the address of a buffer — an area of memory where the file header can be stored.

Before you can use the commands you must open the relevant file in the normal way. If you have a toolkit you can check first that the file exists, using a function like DEVICE STATUS or FOPEN.

You can reserve the buffer, an area of 64 otherwise-unused bytes of memory, with the standard function RESPR or any variety of toolkit functions. Beware of using the SuperToolkit ALCHP function, as it discards the memory as soon as you load a different Basic program. Turbo Toolkit ALLOCATION will not de-allocate memory until you tell it to do so, or the task which owns the memory terminates.

Listing one shows how the routines are used. It

Seconds

lets you read the details of any file and alter the data space. Note the way the date is read and printed. The date is in the standard QL format, a count of the number of seconds since 1st January, 1961. Many systems record only the first date — the time the file was last changed.

The four bytes of a date are treated as a signed value by PEEK_L. Half the possible values are reserved for negative dates, leaving 31 bits for all positive values. That implies that the maximum date is sometime in January 2029 — good enough for most purposes but limiting for pension and insurance programmers.

You can represent later dates with negative numbers, most negative first. Thus you can PEEK and print dates up to DATE$ (-1), or February 6th, 2097, although it is unwise to compare dates using signed arithmetic.

As is often the case on the QL, it is easier to read information than to change it. For some reason best-known to Qdos designer Tony Tebby, the QL FS.HEADS routine re-writes only the first 15 bytes of a header and the length of a file is re-set when the file is closed, so you cannot re-name a file or set the dates this way.

Dataspace

SetHEAD lets you alter the dataspace of a task easily. The old way to do this was to load the whole file with LBYTES, DELETE it and re-save it with SEXEC. SetHEAD does the job much faster and more economically.

You can also SetHEAD to hide information in the 'access,' 'type' and 'extra' slots. Read the header with GetHEAD, POKE the buffer with new values, and store them with SetHEAD. Do not forget to CLOSE the file when you have finished.

The code for GetHEAD and SetHEAD is listed in two forms. Listing two gives a quick way to enter the code without using an assembler. It loads the equivalent machine code from DATA statements and saves the code in a file. Once you have loaded that file, as follows, you

can use SetHEAD and GetHEAD in your own programs.

```
base = RESPR(144) :
LBYTES "file name," base : CALL base
```

The first part of listing two is Marcus Jeffrey's standard loader, used in every month's DIY Toolkit project. Only the DATA, from line 590 onwards, changes from month to month.

Listing three is the assembly code program, assembled using HiSoft Devpac. You can type this text into your assembler if you want to customise the code or merge it with other routines.

The code is straightforward. The START routine calls BP.INIT, the ROM vector which adds new commands to SuperBasic. The table labelled DEFINE indicates that two new procedures are to be added and gives their names and addresses.

ROM vector

The code for each procedure is identical, except that GetHEAD loads the system key for the FS.HEADR routine into D4 whereas SetHEAD loads the key for FS.HEADS. From then it is a matter of checking the parameters and converting them into the form the operating system expects.

First we read the Basic channel number and look up the appropriate system identifier in the SuperBasic table of channel details. If the identifier is negative, or the entry would be outside the limits of the table, we report CHANNEL NOT OPEN. This piece of code can be used whenever you want to pick up a Basic channel number and use it in an extension command.

Long integers

Next we read the remaining parameters as long integers, also known as 32-bit addresses. There should be only one parameter left, the buffer address. We check that it is an even number, as PEEK L and POKE L work only from even locations. Then we copy the parameters into the registers expected by Qdos and call the ROM. If anything goes wrong, Basic will report the error indicated by the value in D0 after the TRAP.

● I shall be back next month with more code and commentary. If you would like to explore a specific area in this column, or implement new commands, particularly ones unavailable in commercial toolkits, please send your suggestion to *QL World*.

Listing one: the program for altering data space.

```
100 buffer=RESPR(64)
110 REPeat loop
120   INPUT "Enter device and file name ";file$
130   OPEN #3,file$
140   GetHEAD #3,buffer
150   PRINT file$;", ";PEEK_L(buffer);" bytes."
160   PRINT "Last altered ";DATE$(PEEK_L(buffer+52))
170   PRINT "Current data space ";PEEK_L(buffer+6)
180   INPUT "Enter new data space ";ds
190   POKE_L buffer+6,ds
200   SetHEAD #3,buffer
210   CLOSE #3
220 END REPeat loop
```

Listing two: standard loader.

```
QL WORLD DIY TOOLKIT Februrary 1988 Listing 2 of 3
-
100 REMark : Sinclair QL World
110 REMark : ** HEX  LOADER **
120 :
130 CLS
140 RESTORE
150 READ space
160 start = RESPR(space)
170 PRINT"Loading Hex..." : hex_load start
180 INPUT"Save to file...";f$
190 SBYTES f$,start,byte
200 STOP
210 :
220 :
230 DEFine PROCedure hex_load(start)
240 :
250   DEFine FuNction decimal(x)
260   RETurn CODE(h$(x))-48-7*(h$(x)>"9")
270   END DEFine decimal
280 :
290 byte = 0 : checksum = 0
300 REPeat load_hex_digits
310   READ h$
320   IF h$="*" : EXIT load_hex_digits
330   IF LEN(h$)<>2*INT(LEN(h$)/2) THEN
340     PRINT"Odd number of hex digits in: ";h$
350     STOP
360   END IF
370   FOR b = 1 TO LEN(h$) STEP 2
380     hb = decimal(b) : lb = decimal(b+1)
390     IF hb<0 OR hb>15 OR lb<0 OR lb>15
400       PRINT"Illegal hex digit in: ";h$
410       STOP
420     END IF
430     POKE start+byte,16*hb+lb
440     checksum = checksum + 16*hb + lb
450     byte = byte + 1
460   END FOR b
470 END REPeat load_hex_digits
480 READ check
490 IF check <> checksum
500   PRINT"Checksum incorrect. Recheck data."
510   STOP
520 ELSE
530   PRINT"Checksum is correct"
540   PRINT"Data entered at: ";start
550 END IF
560 END DEFine hex_load
570 :
580 REMark : Space requirements for the machine code
590 DATA 144
600 :
610 REMark : Machine code data
620 DATA "43FA000A34790000","01104ED20002001E"
630 DATA "0747657448454144","0010075365744845"
640 DATA "4144000000000000","7846600278478BCB"
650 DATA "675A2A0D4BEB0008","3479000001124E92"
660 DATA "664C3031E80054AE","0058264D2A45C0FC"
670 DATA "0028D0AE0030B0AE","00346C2C2A360800"
680 DATA "6B26347900000118","4E9266225343661C"
690 DATA "2031E80008000000","6612204522407440"
700 DATA "766420044E434E75","70FA4E7570F14E75"
840 DATA "*",10007
```

Listing three: assembly code (using HiSoft Devpac).

```
* QL WORLD DIY TOOLKIT - HEADER procedures
* Ver. 0.2, Copyright 1987 Simon N Goodwin.
*
start       lea.l    define,a1
            move.w   $110,a2      BP.INIT vector
            jmp      (a2)
*
define      dc.w     2            Two procedures
            dc.w     gethead-*
            dc.b     7,'GetHEAD' #channel%,address
            ds.w     0
            dc.w     sethead-*
```

```
            dc.b    7,'SetHEAD' #channel%,address
            ds.w    0
            dc.w    0,0,0       No functions
*
sethead     moveq   #70,d4      FS.HEADS key
            bra.s   parse_ch
gethead     moveq   #71,d4      FS.HEADR key
parse_ch    cmp.l   a3,a5       Any parameters?
            beq.s   bad_param
*
* Read the first parameter - the channel number
*
            move.l  a5,d5       Save end of table
            lea.l   8(a3),a5    Isolate parameter
            move.w  $112,a2     Vector to get integers
            jsr     (a2)
            bne.s   bad_exit
            move.w  0(a1,a6.l),d0
            addq.l  #2,$58(a6)  Lose stacked integer
            move.l  a5,a3       Step past parameter
            move.l  d5,a5
*
* Convert channel number in D0 to channel ID in D5
*
chan_sel    mulu    #40,d0      Channel table size
            add.l   $30(a6),d0  Add base offset
            cmp.l   $34(a6),d0
            bge.s   what_chan   Past end of table?
            move.l  0(a6,d0.l),d5
            bmi.s   what_chan   Closed if negative
*
* Read and check the address parameter in D0
*
            move.w  $118,a2     Vector gets addresses
            jsr     (a2)
            bne.s   bad_exit
            subq.w  #1,d3       Test No. of parameters
            bne.s   bad_param   Reject unless it's one
            move.l  0(a1,a6.l),d0
            btst    #0,d0       Is the parameter odd?
            bne.s   bad_param
*
* Set standard registers and exit via QDOS
*
            move.l  d5,a0       Set up channel ID
            move.l  d0,a1       ... buffer address
            moveq   #64,d2      ... buffer length
            moveq   #100,d3     ... allow two seconds
            move.l  d4,d0       ... set the trap key
            trap    #3          Call QDOS
            rts                 Return error code
*
what_chan   moveq   #-6,d0      CHANNEL NOT OPEN error
            rts
bad_param   moveq   #-15,d0     BAD PARAMETER error
bad_exit    rts
            end
```

DIY TOOLKIT

THE LOST LISTING

```
1                       * QL WORLD DIY TOOLKIT - EDLINE$ function, by Simon N Goodwin
2                       *
3  00000000 43FA000A    start   lea.l   define,a1
4  00000004 347900000110       move.w  $110,a2     BP.INIT
5  0000000A 4ED2               jmp     (a2)
6                       *
7  0000000C 00000000    define  dc.w    0,0         No procedures
8  00000010 0001               dc.w    1           One function
9  00000012 000C               dc.w    edline-*
10 00000014 0745444C494E4524   dc.b    7,'EDLINE$'
11 0000001C 0000               dc.w    0           End of functions
12                      *
13 0000001E 2A0D     edline     move.l  a5,d5       Save last parameter address
14 00000020 4BEB0018            lea.l   3*8(a3),a5  Check for three parameters
15 00000024 BA8D                cmp.l   a5,d5
16 00000026 6654                bne.s   bad_param   Not 3 unless A3+24 = A5
17                      *
18                      * Read the first two parameters: channel number and buffer size
19                      *
20 00000028 518D                subq.l  #8,a5       Hide the last parameter
21 0000002A 347900000112        move.w  $112,a2     CA.GTINT - get two ints
22 00000030 4E92                jsr     (a2)
23 00000032 664A                bne.s   bad_exit
24 00000034 58AE0058            addq.l  #4,$58(a6)  Tidy 2 ints off maths stack
25 00000038 3E31E802            move.w  2(a1,a6.l),d7 Grab the buffer length
26 0000003C 264D                move.l  a5,a3       Retrieve the last parameter
27 0000003E 2A45                move.l  d5,a5
28 00000040 3E31E802            move.w  2(a1,a6.l),d7
29                      *
30                      * Convert stacked channel number to channel ID in D5
31                      *
32 00000044 3031E800            move.w  0(a1,a6.l),d0 Grab the channel number
33 00000048 C0FC0028            mulu.w  #40,d0      Find offset in table
34 0000004C D0AE0030            add.l   $30(a6),d0  Add base offset
35 00000050 B0AE0034            cmp.l   $34(a6),d0  Check not beyond end
36 00000054 6C22                bge.s   what_chan
37 00000056 2A360800            move.l  0(a6,d0.l),d5 Get channel ID
38 0000005A 6B1C                bmi.s   what_chan   Channel must be open
39                      *
40                      * Get the default string and check it fits the buffer
41                      *
42 0000005C 347900000116        move.w  $116,a2     CA.GTSTR - get a string
43 00000062 4E92                jsr     (a2)
44 00000064 6618                bne.s   bad_exit
45 00000066 5247                addq.w  #1,d7       Allow for terminator/cursor
46 00000068 202E0008            move.l  8(a6),d0    Get offset of end of buffer
47 0000006C 5180                subq.l  #8,d0       Allow for 8 coordinate bytes
48 0000006E 9096                sub.l   (a6),d0     D0 is now maximum buffer size
49 00000070 BE40                cmp.w   d0,d7       See if the chosen size fits
50 00000072 6516                bcs.s   got_room
51                      *
52 00000074 70FB                moveq   #-5,d0      BUFFER FULL error
53 00000076 4E75                rts
54 00000078 70FA     what_chan  moveq   #-6,d0      CHANNEL NOT OPEN error
55 0000007A 4E75                rts
56 0000007C 70F1     bad_param  moveq   #-15,d0     BAD PARAMETER error
57 0000007E 4E75     bad_exit   rts
58                      *
59 00000080 4E43     call_QDOS  trap    #3          General-purpose ROM caller
60 00000082 4A80                tst.l   d0
61 00000084 6702                beq.s   hunky_dory
62 00000086 588F                addq.l  #4,a7       Return to previous caller
63 00000088 4E75     hunky_dory rts
64                      *
65                      * Put the string in the buffer; save first 8 bytes for later
66                      *
67 0000008A 41E90002 got_room   lea.l   2(a1),a0    Move FROM (offset)
68 0000008E 2456                movea.l (a6),a2     Move TO (offset)
69 00000090 508A                addq.l  #8,a2       Save first 8 bytes
70 00000092 3431E800            move.w  0(a1,a6.l),d2
71 00000096 3C02                move.w  d2,d6       D6 is a copy of the length
72 00000098 224A                move.l  a2,a1       A1 will point at the string
73 0000009A BC47                cmp.w   d7,d6       Check it'll fit!
74 0000009C 64DE                bcc.s   bad_param   Reject if D7>=D6
75 0000009E 610000A8            bsr     move_str    Move D6 bytes to (A6,A2)
76 000000A2 2808     no_move    move.l  a0,d4       D4 is the empty stack offset
77                      *
78                      * Find out where we are on the screen
79                      *
80 000000A4 76FF     where      moveq   #-1,d3      Timeout
81 000000A6 2045                move.l  d5,a0       Channel ID
82 000000A8 2A09                move.l  a1,d5       Save string pointer
83 000000AA 2256                movea.l (a6),a1     Put coords. at start of buffer
```

QL WORLD owes an apology to Simon Goodwin and the DIY Toolkit readers: owing to a mix-up in the moves at the QLW office over the last two months, the listings which should have accompanied DIY Toolkit in the January issue were left on the cutting room floor. The article featured EDLINE$, a string function for editing and confirming individual lines of text.

The program is listed below: listing one is the assembly code program; listing two is the standard machine code loader, with EDLINE$ data.

The EDLINE$ listings are therefore self-contained for anybody who wants to make a copy of these pages to collate with the January edition of DIY Toolkit.

EDLINE$ listing one: assembly code.

```
000000AC 4E44                   trap    #4          Buffer is A6 relative
000000AE 700B                   moveq   #11,d0      SD.CHENQ
000000B0 61CE                   bsr.s   call_QDOS
                        *
                        * Go to the initial cursor position and print the text
                        *
000000B2 2256           go_there movea.l (a6),a1    Find coordinate buffer
000000B4 32369804               move.w  4(a6,a1.l),d1 Extract cursor X
000000B8 4842                   swap    d2          Save length
000000BA 34369806               move.w  6(a6,a1.l),d2 Extract cursor Y
000000BE 7010                   moveq   #16,d0      SD.POS
000000C0 61BE                   bsr.s   call_QDOS
000000C2 4842                   swap    d2          Retrieve the length
000000C4 2245                   move.l  d5,a1       Restore the start pointer
000000C6 4E44                   trap    #4          Pointer is A6 relative
000000C8 7007                   moveq   #7,d0       IO.SSTRG
000000CA 61B4                   bsr.s   call_QDOS
000000CC 7220                   moveq   #32,d1
000000CE 7005                   moveq   #5,d0       IO.SBYTE - blank end of line
000000D0 61AE                   bsr.s   call_QDOS
000000D2 7013                   moveq   #19,d0      SD.PCOL - move cursor to blank
000000D4 61AA                   bsr.s   call_QDOS
                        *
                        * Call up the editor
                        *
000000D6 3202           edit    move.w  d2,d1       Put cursor at end of text
000000D8 4841                   swap    d1
000000DA 3202                   move.w  d2,d1       Indicate length of text
000000DC 2256                   movea.l (a6),a1     Find buffer
000000DE 43F11008               lea.l   8(a1,d1.w),a1 Point to last character
000000E2 3407                   move.w  d7,d2       Maximum length
000000E4 4E44                   trap    #4          Everything is relative!
000000E6 7004                   moveq   #4,d0       IO.EDLIN
000000E8 4E43                   trap    #3
000000EA 4A80                   tst.l   d0
000000EC 6A1A                   bpl.s   edited      No error: check terminator
000000EE 0C40FFFF               cmpi.w  #-1,d0      Did the user type BREAK?
000000F2 6608                   bne.s   whats_up
000000F4 700F                   moveq   #15,d0      SD.CURS for AH & JM ROMs
000000F6 6188                   bsr.s   call_QDOS  which leave the cursor on
000000F8 70FF                   moveq   #-1,d0      Error: not complete
000000FA 4E75           begone  rts
                        *
000000FC 0C40FFFB       whats_up cmpi.w  #-5,d0     Buffer overflow?
00000100 66F8                   bne.s   begone      Give up if anything else!
00000102 5341                   subq.w  #1,d1       Discard the last character
00000104 3401           re_enter move.w  d1,d2      Slide up to the end-stop
00000106 60AA                   bra.s   go_there    Try again
                        *
00000108 5341           edited  subq.w  #1,d1       Don't count last character
0000010A 5389                   subq.l  #1,a1       Point at it
0000010C 0C36000A9800           cmpi.b  #10,0(a6,a1.l)
00000112 66F0                   bne.s   re_enter    Restart unless it was ENTER
                        *
00000114 5584           enter   subq.l  #2,d4       Make room to stack length
00000116 2D440058               move.l  d4,$58(a6)  Reset maths stack pointer
0000011A 3C01                   move.w  d1,d6       Keep length for move later
0000011C 48C1           allocate ext.l  d1
0000011E 3479000011A            move.w  $11A,a2     BV.CHRIX
00000124 4E92                   jsr     (a2)        Allocate space for text
00000126 226E0058               move.l  $58(a6),a1
0000012A 93C6                   suba.l  d6,a1       Make room for text
0000012C 08060000               btst    #0,d6       Ensure A1 is even before
00000130 6702                   beq.s   on_grid     ...stacking the length
00000132 5389                   subq.l  #1,a1
00000134 3386E800       on_grid move.w  d6,0(a1,a6.l)
00000138 2D490058               move.l  a1,$58(a6)
0000013C 2056                   movea.l (a6),a0
0000013E 5088                   addq.l  #8,a0       A0 is offset of text in buffer
00000140 45E90002               lea.l   2(a1),a2    A2 is destination offset
00000144 7801                   moveq   #1,d4       Return a string
00000146 7000                   moveq   #0,d0       No error
                        *
                        * MOVE_STR: Moves D6 bytes, wordwise, from offset A0 to A2
                        *
00000148 5346           move_str subq.w  #1,d6      Count:=(D6-1) DIV 2
0000014A 6B10                   bmi.s   null_move
0000014C E24E                   lsr.w   #1,d6       ...prepare to DBRA words
0000014E 3DB868800A800  move_some move.w  0(a6,a0.l),0(a6,a2.l)
00000154 548A                   addq.l  #2,a2
00000156 5488                   addq.l  #2,a0
00000158 51CEFFF4               dbra    d6,move_some
0000015C 4E75           null_move rts
                                end
```

EDLINE$ listing two: hex code loader.

```
100 REMark : Sinclair QL World
110 REMark : ** HEX  LOADER **
120 :
130 CLS
140 RESTORE
150 READ space
160 start = RESPR(space)
170 PRINT"Loading Hex..." : hex_load start
180 INPUT"Save to file...";f$
190 SBYTES f$,start,byte
200 STOP
210 :
220 :
230 DEFine PROCedure hex_load(start)
240 :
250     DEFine FuNction decimal(x)
260     RETurn CODE(h$(x))-48-7*(h$(x)>"9")
270     END DEFine decimal
280 :
290 byte = 0 : checksum = 0
300 REPeat load_hex_digits
310     READ h$
320     IF h$="*" : EXIT load_hex_digits
330     IF LEN(h$)<>2*INT(LEN(h$)/2) THEN
340       PRINT"Odd number of hex digits in: ";h$
350       STOP
360     END IF
370     FOR b = 1 TO LEN(h$) STEP 2
380       hb = decimal(b) : lb = decimal(b+1)
390       IF hb<0 OR hb>15 OR lb<0 OR lb>15
400         PRINT"Illegal hex digit in: ";h$
410         STOP
420       END IF
430       POKE start+byte,16*hb+lb
440       checksum = checksum + 16*hb + lb
450       byte = byte + 1
460     END FOR b
470 END REPeat load_hex_digits
480 READ check
490 IF check <> checksum
500     PRINT"Checksum incorrect. Recheck data."
510     STOP
520 ELSE
530     PRINT"Checksum is correct"
540     PRINT"Data entered at: ";start
550 END IF
560 END DEFine hex_load
570 :
580 REMark : Space requirements for the machine code
590 DATA 350
600 :
610 REMark : Machine code data
620 DATA "43FA000A34790000","01104ED200000000"
630 DATA "0001000C0745444C","494E452400002A0D"
640 DATA "4BEB0018BA8D6654","518D347900000112"
650 DATA "4E92664A58AE0058","3E31EB02264D2A45"
660 DATA "3E31EB023031EB00","C0FC0028D0AE0030"
670 DATA "B0AE00346C222A36","0B006B1C34790000"
680 DATA "01164E9266185247","202E000851B09096"
690 DATA "BE40651670FB4E75","70FA4E7570F14E75"
700 DATA "4E434AB067025B8F","4E7541E900022456"
710 DATA "508A3431EB003C02","224ABC4764DE6100"
720 DATA "00AB280876FF2045","2A0922564E44700B"
730 DATA "61CE225632369804","4B4234369B067010"
740 DATA "61BE4B4222454E44","700761B472207005"
750 DATA "61AE701361AA3202","4B413202225643F1"
760 DATA "100B34074E447004","4E434AB06A1A0C40"
770 DATA "FFFF6608700F6188","70FF4E750C40FFFB"
780 DATA "66F85341340160AA","53415389DC36000A"
790 DATA "9B0066F055842D44","00583C0148C13479"
800 DATA "0000011A4E92226E","005893C60B060000"
810 DATA "6702538933B6E800","2D49005B20565088"
820 DATA "45E900278017000","53466B10E24E3DB6"
830 DATA "B800AB0054BA5488","51CEFFF44E75","*"
840 DATA 28250
```

SECTOR

SPELLBOUND

REAL TIME spelling checker for Quill or The Editor V1.17 onwards on the expanded Sinclair QL.

Spell Bound checks input by the character against its 30,000+ word dictionary. It has 5 switchable modes of operation to suit a variety of typing styles with the dictionary available at all times. Spell Bound displays example words on request and operates with no discernable reduction in the operating speed of Quill. The dictionary is fully user expandable to memory/media limits.

Available on disc or Microdrive at only £29.95

SOFTWARE 1

Touch Typist	£12.00
Task Master	£25.00
Spellbound	£29.95
Turbo Quill+	£14.00
Turbo Quill	£12.00
Cartridge Doctor	£13.00
Eye Q	£29.00
Turbo	£99.00
The Editor (DP)	£30.00
Project Planner	£30.00
Forth	£34.00

SOFTWARE 2

Toolkit 2 (EPROM)	£34.00
TechniQL	£49.00
Media Manager	£40.00
Front Page	£23.00
Scrabble	£15.00
Keydefine	£10.00
Talent Workbench	£25.00
Supercharge	£49.00
Psion Chess	£17.00
Better Basic (DP)	£20.00
Home Finance	£20.00

FLASHBACK

See opposite for details

TASKMASTER

THE ULTIMATE

- **NOT JUST** another multi tasking program, but a complete front end memory management system for the expanded Sinclair QL.
- **ON SCREEN CALCULATOR** with many features including delta percentage mark up.
- **POWERFUL FILE MAINTENANCE** of discs and Microdrives.
- **NOTEPAD** with word wrap and 'send note' feature.
- **SOFTWARE RESET** scans for, and warns of any vulnerable open files at close down.
- **SERIAL PRINTER BUFFER** user configurable up to 32K
- **DUPLICATE CODE SHARING** allows multiple copies of the same program without losing memory to additional code space e.g. 12 copies of Abacus with 230K free.
- **COMMAND FILE MODULE** easily creates files which will operate the machine in your absence. For example it could load quill, fill in your address, type a standard letter and print it.. You will, however, have to post it yourself.
- **TASKMASTER** does not consume vast amounts of memory. If you wish only to use the multi tasking module, that is all you need to load, thus using only a small slice of memory. The choice is always yours
- **USER FRIENDLY.** It was described as "virtually idiot proof" by a major software reviewer.

Available on disc or Microdrive and still only £25

CAMBRIDGE COMPUTERS Z88

-from Sir Clive Sinclair **£287**

- Built in screen
- Full size keyboard
- Built in word processor
- spreadsheet and database
- 32K RAM
- Diary and Calculator
- Comms software
- All Z88 accessories available
- Runs for 20 hrs on 4 AA batteries
- Many more features

QZ

QL-Z88 file transfer software

£15 (Ql-Z88 cable - £8)

Allows you to use the QL for storage and editing of files, or to use the Z88 as a portable data terminal. Available on 3.5in. disc or Microdrive

SOFTWARE

NEW FROM SECTOR SOFTWARE

FLASHBACK

FLASHBACK

An entirely new concept in fast information storage, retrieval and manipulation on the Sinclair QL. Flashback is written by Peter J Jefferies, author of Taskmaster and Spellbound and is designed to be user-friendly, powerful, flexible and very fast.

The master program is memory based and will operate in different forms, dependant on whether running on a standard or expanded machine. Easily build your own reference system from scratch or import existing Quill list files, Archive export files, Editor text files and even Superbasic program listings.

FLASHBACK

FLASHBACK

Uses infinitely variable non-destructive windows and is designed to overlay the current program when required. Built-in text editing, free-form structure supporting, varied selecting, sorting and location features.

ONLY £25

TOUCH TYPIST

Don't even think about buying a replacement keyboard until you know how to use the one you already have.

Why type slowly when you can be typing at professional speeds? Touch Typist is the fastest typing tutor available for the Sinclair QL. It will teach you to type at up to 211 wpm. It is 100% machine code and has:

● 3 teaching modes● adjustable speed and accuracy targets
● very fast interactive keyboard● results display graphs

Customise any or all of the 200 lessons which can then be saved to create a library of custom lesson sets. Touch typist will run from disc, Microdrive or ramdisc. Available on disc or Microdrive for only £12.

"Succeeding admirably as a serious course intended for beginners and experienced typists alike...includes the professional polish of good quality software" - QL World

QL SPARES

Service Manual - This is the most up to date book for repairing the QL. It contains all circuit diagrams, faultfinding charts and oscilloscope displays to enable you to repair your own QL or understand how it works - **£25.00**

QL Test Software - Including RS232 loopback lead. Tests all major functions of the computer - sound, colour, keys, RS232, Micro-drive etc. Used by repair companies - **£14.00**

Keyboard membrane	£6.00
Bubble mat	£3.00
JS ROM set	£28.00
ZX8301 ULA	£12.00
ZX8302 ULA	£13.00

VARIOUS

Trump Card	£195.00
QL dustcover	£5.00
Microdive labels on tractor feed per 100	£3.50
20 Microdrives in Transform storage box	£39.00
Internal 640K memory upgrade	£99.00
Miracle autodial modem	£45.00
Astracom 1000 modem	£199.00
Microvitec 1451DQ3 dedicated monitor	£260.00
Parallel printer interface	£19.50

39 WRAY CRESCENT, ULNES WALTON, LEYLAND, LANCS PR5 3NA
Tel: 0772 454328, Prestel mailbox 772454328
ALL PRICES INCLUDE VAT AND P & P

Access VISA

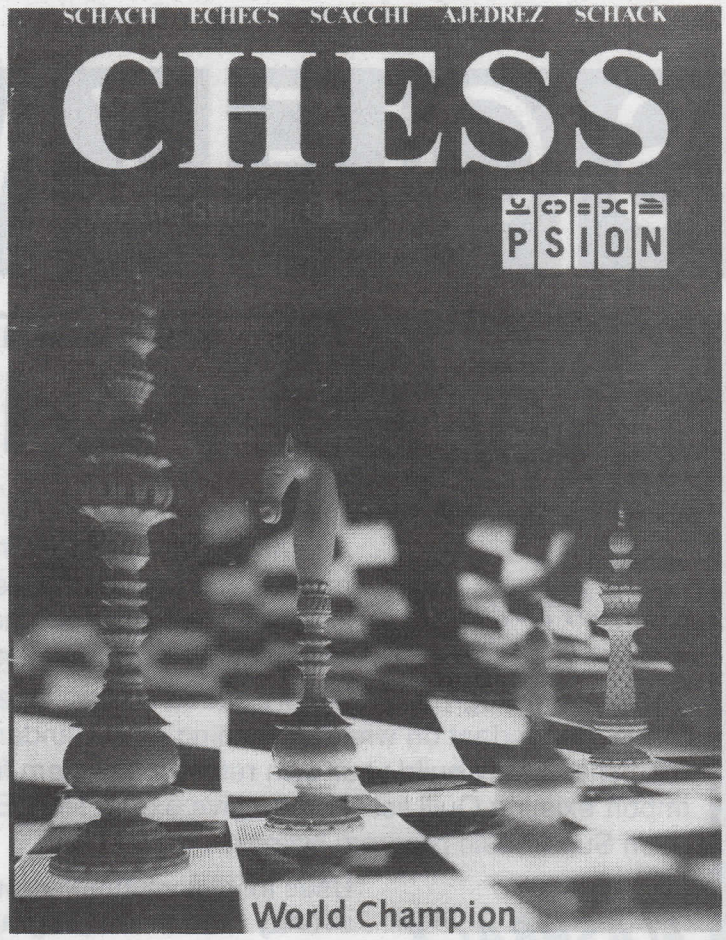
£5 OFF PSION CHESS!

★ Spectacular 3D Chess Game . . .

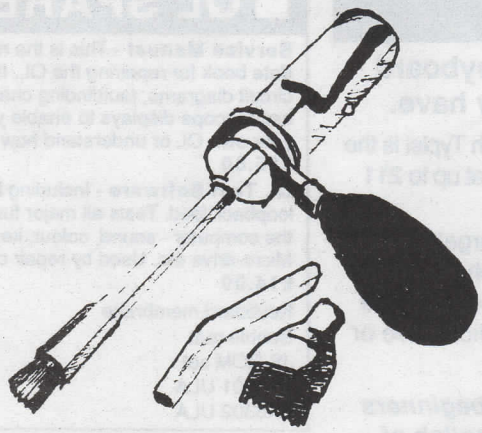
★ Easy to use, a pleasure to play

★ Suitable for all ages and levels

Normal Price £19.95
Special Price £14.95
p & p 50p

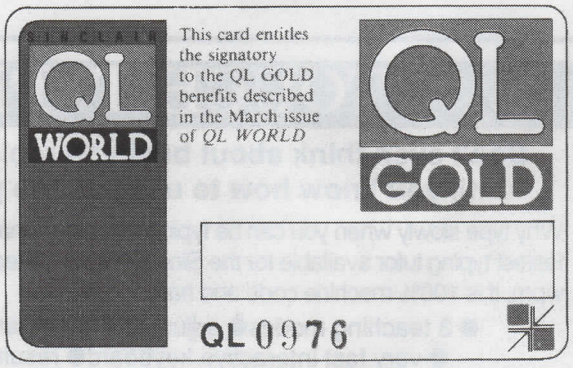


VERSATILE MINI–VAC



This handy little vacuum cleaner is the most efficient way of banishing dust from your computer, stereo system, or any place where dust can accumulate. Dual action vaccuum or blow can extend the working life of delicate components. The mini-vac complete with assorted nozzles to reach even the most awkward places.
£7.95 (Post and Packing £1)

QL GOLD WINNER!

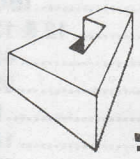


The lucky winner of our Xmas Prize Draw is:
Mr K. W. Bromell,
15 Walton Park,
Harrogate,
N. Yorks,
HG3 1EJ.

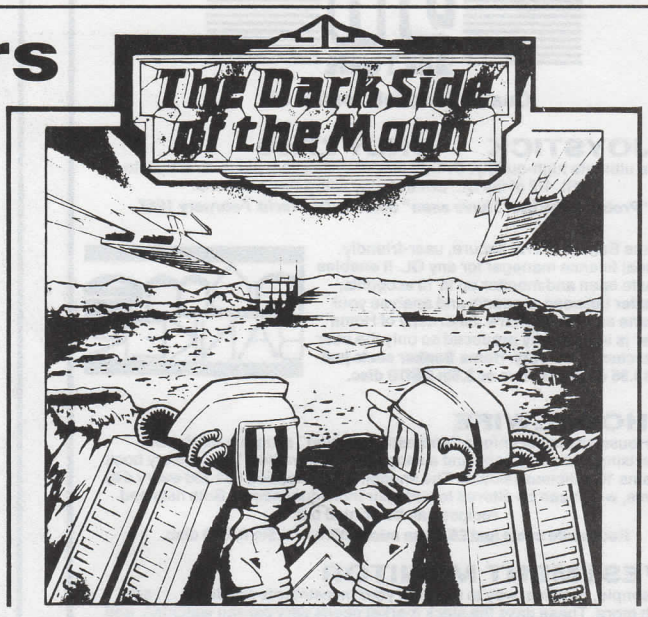
QL GOLD no. QL0369
Congratulations, you will receive a set of QL books, a calculator, a box with 20 cartridges and a game.
More QL GOLD news coming soon . . . WATCH THIS PAGE!

Special Readers Price only £9

- 2 Cartridges
- 150 Descriptive and imaginative locations.
- Problems mazes traps and puzzles
- Extensive Vocabulary
- 50 Objects
- Intelligent characters to carry out tasks.

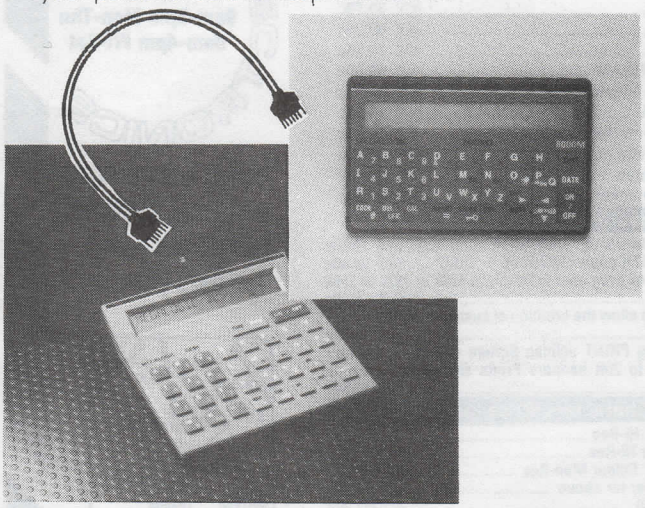


Javid Systems



LINKED EFFICIENCY from METALOGIC

The remarkable new ML8000 is an 8K computer, designed for your desk (but slipping easily into your briefcase). It can replace your ***address*** and ***telephone book*** and stores up to 8000 alphabetical or numerical characters. It can also replace you ***diary*** and with 16 alarms that can be programmed up to a year in advance, you need never forget an appointment or birthday again! The time mode can be set to display time and date, and the the your function calculator can be used without disturbing any data in the memory replacing your calculator as well! The directory scrolls through files or offers instant recall, and you can code your personal data to keep files secure.



The 8000 also comes in credit card size, which slips into your wallet, and has the same functions as the desktop version.

If you can't make your mind up between the two, why not have **BOTH** and take advantage of the **FREE CABLE** (normally £9.95) which **LINKS** the two and allows you to copy data from one to the other!

ML 8000	**DESKTOP SIZE**	**£29.95**
ML 8000	**CREDIT CARD SIZE**	**£24.95**

POST & PACKING £1.50

ORDER FORM QL WORLD (Feb)

Please tick the items you require from the list below and allow 28 days for delivery.

NAME .....
ADDRESS .....
.....
..... **Postcode** .....

Keyboard Controller	£7.50	☐
Psion Chess	£15.45	☐
Mini Vac	£8.95	☐
Dark Side of the Moon	£9.00	☐
ML8000 Desk Top Size	£30.45	☐
Credit Card Size	£26.45	☐
Subscription (UK)	£15.00	☐
(Overseas)	£30.00	☐

TOTAL ORDER £

Payment is by (please tick)

Cheque	Postal	Access	Visa
☐	☐	☐	☐

Made payable to Focus Magazines Ltd

My credit Card number is .....
.....

Expiry Date.....

Send this form together with payment to:

Focus Salespoint
Focus Magazines
Greencoat House
Francis Street
London SW1P 1DG

TELEPHONE ORDERS
01-834 1717
Anne Arnold

DJW SOFTWARE

Quality Products for the QL

QL JOYSTICK ONLY £7.99

The ultimate high-quality, British-made joystick that plugs directly into CTRL 1/2 of the QL. Control play with 2 firing buttons.

"Probably the best I have seen" Sinclair/QL World. February 1987

Home Banker is THE secure, user-friendly, personal finance manager for any QL. It enables you to open and monitor up to 10 accounts, transfer between accounts and analyse your income and expenditure. Each copy of Home Banker is individually produced so only the user has access to the data. **Home Banker costs just £14.95 on microdrive or 3.5in DSDD disc.**

home BANKER

QL HOUSEWIFE

Housewife is the unique "domestic planning" program for the QL, comprising a cookery book and a shopping list compiler. The cookery book contains 18 delicious recipes. The shopping list supplied has 280 every day items, which can be altered to suit your individual needs. Both lists and recipes can be printed out.

Housewife costs just £5.99 on microdrive or 3.5in DSDD disc.

INVESTMENT MONITOR

A simple, practical way to see how your investments are doing . . . and much more. These days the stock market needs very careful watching, and an outlay of just £19.99 (microdrive or 3.5in DSDD disc) could save you hundreds.

SEE US ON STAND 47 AT THE 26th ZX MICROFAIR ON FEBRUARY 6th

FOR FURTHER DETAILS SEND S.A.E. FOR THE DJW GAZETTE

Order direct from: DJW Software (QLW3), 11 Pound Close, Bramley, Hants RG26 5BL or 'phone (0256) 881701 with your Access card. Overseas orders please add £2 to cover extra P&P charges. Cheques/POs payable to DJW Software.

ADVERTISERS' INDEX

Athene Consultants 26
Byteback 18
Care Electronics 52
Compware 26
Creative Codeworks 17
CST ..... 14 & 15
Dataskip 43
Digital Precision ..... 4 & 5
DJW Software 52
Eidersoft 28
GAP Software 43
Javid Systems 26
Liberation Software 43
Maxtronics ..... IFC
Metacomco 9
MPC ..... IBC
PDQL ..... 12 & 13
Pyramide 42
Q Jump 33
QL Advice Group 8
Quantum Computing 18
Sandy UK 27
Smiling Software 58
SPEM 58
Strong Computers ..... OBC
S.U.B. 19
Tandata 11
TK Computerware 6
Tony Firshman Services 58
Transform 57
WD Software 11
ZX Microfair 41

QL SUPERTOOL KIT II by Tony Tebby THE ULTIMATE QL ENHANCEMENT

Over 118 Commands:- Full Screen Editor, Key Define Print Using, Last Line Recall, Altkey, Job Control, File Handling, Default Directories, Extended Network.

16K Eprom Cartridge Version ..... @£ 29.90d
Configurable Version on Microdrive ..... @£ 28.75d

SANDY PRODUCTS

Sandy SuperQboard (512k, TOOLKIT II etc) ..... @£187.45d
Sandy 512k THRU-CARD ..... @£ 77.05d
Sandy 512k THRU-CARD & QRAM Front End ..... @£105.80d
Sandy Disc + Printer Interface + Utilities ..... @£ 80.50d

SUPER MOUSE/SUPERQBOARD
Qram Multitasking Front End by Tony Tebby. Quality Mouse, 512K RAM, SUPERTOOLKIT II, Disc and Printer Interface, Cadpak Graphics ..... @£236.90d
Hard disk and disk i/face with 1 large Mb RAM — Please call for details

QL HARDWARE

Single 3.5" Disc Drive & (Own PSU) ..... @£115.00a
Dual 3.5" Disc Drive & (Own PSU) ..... @£195.50a
"Multi Drive 5.25" - 3.5" ..... @£218.50b
Citizen LST — 10 printer ..... @£186.88a
QL Keyboard Membrane ..... @£ 18.40d
QL Base Computer ..... @£124.20a
QEPIII Advanced Eprom Programmer ..... @£121.90d
Care Eprom Cartridges each ..... @£ 6.90c
Eprom 27128 250n/s 16K ..... @£ 5.75c

MAGNETIC MEDIA

Microdrives (each) ..... @£ 1.98c
3.5" (each) ..... @£ 2.30c
3.5" (10 of) ..... @£ 20.70c

THE Q CONTROL BOARD

As specified in the Colin Oppie Connextions Series — Please call for details ..... @£ 89.95d
Analogue/digital chip ..... @£ 26.91c

CPM EMULATOR for the QL ..... @£44.85d

QL GAMES

AMBITION By Way Ahead ..... @£ 19.95c
Business Orientated Strategy "Super Monopoly"
QL YAHTZEE ..... @£ 9.20c

TONY TEBBY Software (QJUMP)

QRAM "new" COMPLETE QL MULTITASKING FRONT END A TRULY AMAZING DEVELOPMENT FROM QJUMP POP UP MENUS, FAST RAM DISC, UTILITIES, HOTKEYS SCREEN/WINDOW DUMPS, PRINT SPOOLER ETC ..... @£ 29.90d
QIMI QL Internal Mouse Interface. Keeps your Rom port free.
QIMI + R/T BBU ..... @£ 39.79c
QIMI + QRAM ..... @£ 63.25c
QIMI + MOUSE ..... @£ 79.35c
QIMI + MOUSE + QRAM ..... @£ 98.90c
QFLP (Micro/P disc interface upgrade) ..... @£ 14.95c
QMON II Microdrive ..... @£ 19.95c
QMED (Medic disc interface upgrade) ..... @£ 14.95c
QPTR Pointer Interface m/drive ..... @£ 34.50c
QPTR Pointer Interface + 3.5" disk ..... @£ 29.90c
QTYP Type/Spell Checker ..... @£ 29.90c

ZITASOFT Software By Steve Jones

LOCKSMITHE copies M/DRIVE — M/DRIVE ..... @£ 11.50c
4MATTER + LOCKSMITH copies M/DRIVE — DISC ..... @£ 23.00c
SHRIVEL memory shrink prog user definable ie 128k or 192k or 256k etc ..... @£ 6.90c
TOOLCHEST utilities to allow the creation of customised mdv doctor prog. ..... @£ 11.50c
SIDEWINDER amazing PRINT utilities Screen dumps to any size from postage stamp to 20ft banners Prints sideways, inverts & scales ..... @£13.80c

MONITORS 85 Characters (Price including lead)

Philips BM7502 Green Hi-Res ..... @£ 89.70a
Philips BM7522 Amber Hi-Res ..... @£ 92.00a
Philips CM8833 "new" Colour Med-Res ..... @£289.80a
Philips AV7300 Tv/Tuner for above ..... @£ 74.75b
Philips Tv/Monitor 1010 ..... @£262.20a
Remote Tv/Monitor 1210 ..... @£279.45a

READYMADE LEADS

RGB QL DIN to Phono ..... @£ 5.29c
RGB 8-6 pin DIN ..... @£ 5.29c
RGB 8-7 pin DIN (Hitachi) ..... @£ 6.90c
RGB 8-7 pin DIN (Ferguson) ..... @£ 6.90c
RGB 8 pin to SCART (Euro) ..... @£ 9.20c
6way PCC-25way 'D' (Printer-Ser1) ..... @£ 9.20c

PSION ORGANISER ..... P.O.A.

HOW TO ORDER:

ALL PRICES INCLUDE VAT

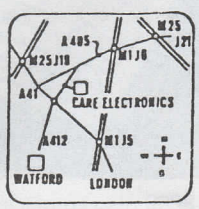
By Post. Enclose your Cheque/P.O. made payable to CARE Electronics. Or use ACCESS/VISA. Allow 7 days for delivery.

Please add carriage. a-£10.35 b-£5.75 c-£1.15 d-£2.30

CARE ELECTRONICS

OPEN
9am-5pm Mon-Thu
9am-4pm Fri-Sat

800 ST ALBANS ROAD,
GARSTON, WATFORD,
HERTS. WD2-6NL.
Tel: 0923-672102



NEW HARD DISK INTERFACE WITH 1Mb RAM

MICRO ADS

PRO CAD 3

A professional 3D modelling package

AS REVIEWED OCT. 87 QL WORLD.

"PC3 can be highly recommended"
Ron Massey Version 2 now only available from

DATANET SYSTEMS

£35.00 + £1.00 pp UK or £3.00 pp outside UK

For free details send sae to:

DATANET SYSTEMS
PO Box 121 Luton, Beds

BUDGET SOFTWARE: 4 QL Games only £1.20

(Musical Interlude, Wildwest, Pairs, Puzzler) or send for Supremacy, £4.95 Cavern Frenzy, £3.49, Pictures (16 Screens) £2.20 and others (Free leaflet available)
Include a microdrive/3.5" disc for each program. Make cheque/PO payable to

F. HARKINS, 'Longridge', Bridgend, Stewarton Ayrshire KA3 5HP. Tel: (0560) 82764

QL CHESS ARCHIVES — Record and display chess games, and store them in files of about 100 games. Large clear 2D display. Turbo-compiled SuperBasic. (Note that the program does not "play" chess!). Cheque/PO for £10 (Standard QL) or £12 (Expanded QL) to: M. J. Edwards, 6 Sandpiper Close, Sanderling Park, St Mellons, South Glamorgan, CF3 0DL.

FOR SALE

QL (JM) with Cool-Run Regulator, 512K Expanderam, Qflash on Eprom, Green Screen Monitor, Taskmaster, Psion 2.35, 25 Microdrives in Transform Box, complete with all leads and manuals. Bargain price £240 ONO.

Mr Goldwyn
Tel: Purfleet 861393

QL SMALL TRADER'S PACK 2

Accounts, VAT, Stock Control, Mailing List, Label Printer plus utilities. All for £24.95 on two mdvs. "Simple to use, a good deal for the money." (QL WORLD) "Fully menu driven & Epson-compatible" **QL INVOICER:** prints smart invoices & statements on plain/headed paper. Only £14.95 (£9.95 with pack). **QL BANK ACCOUNT £9.95, QL FILER (4 progs) £9.95.** Programs Customised/Designed at reasonable cost. Add £2 pp (abroad) Cheques, POs or SAE for details:

SD MICROSYSTEMS (DEPT QL)
PO BOX 24, HITCHIN, HERTS, U.K.
U.K. Tel: (0462) 675106

---

microdeal **QL GAMES**
ALL PROGRAMMES FULL MACHINE LANGUAGE

NOW JUST £9.95 EACH

FLIGHT SIMULATOR – Full feature flight simulator of a light aircraft.
LANDS OF HAVOC – 2000 Screen arcade adventure described as the first mega game for QL.
CRAZY PAINTER – Zany slapstick for painting the floor.
HOPPER – Frogger style game for the QL
AQUANAUT 471 – Graphic adventure with over 100 screens.
THE KING – Just like Donkey Kong.
STONE RAIDER II – Dig your way through screen after screen of boulders and treasures.
CUTHBERTS IN SPACE – Real time space shoot 'em up for the QL.

POST & PACKING £1 PER ORDER

Access VISA AMERICAN EXPRESS

ORDER — By Phone - 0726 68020
By Post - Box 68, St Austell, Cornwall PL23 1ET

QL REPAIRS

ANY FAULT **£27.95** INCLUSIVE OF P&P, VAT INSURANCE AND 3 MONTHS GUARANTEE. FOR REPAIRS ON OTHER MICROS PHONE FOR DETAILS.

SUREDATA

Telephone: 01-902 5218

UNIT 6, STANLEY HOUSE
STANLEY AVENUE, WEMBLEY
MIDDX. HA0 4JBQ

"DATA INTERCHANGE SOFTWARE that will allow you to copy QL files to and from floppy disks that are in either IBM format or a wide variety of CPM formats. CPMCOPY £15, IBMCOPY £15, both for £20 or send A4 sized SAE for further details. Available from **D. J. Walker, 22 Kimptons Mead, Potters Bar, Herts, EN6 3HZ."**

QL Cross Assemblers

Assemble codes for Z80 6502/CMOS and Z8 processors, including simple editor. Only £12 per processor. Cheque/PO — C. Land, 403 Chapter Road, Dolls Hill, London NW2 5NG.

INKWELL DELUXE Version 2.8

Powerful font designer and print utility. Works with any Epson compatible daisy wheel. Has 16 fonts and new fonts can be designed easily on a 16 x 16 grid. Extensive design commands such as shadow ('unbelievable,' S. Bhatti QUANTA 1987) squeeze, rotate, flip, outline and angle. Print out QUILL or ASCII files in 1000's of ways. 3 heights, 9 widths, proportional or equal spacing, adjustable print density. Preview option lets you see documents as it will be printed! Special offer was £16.00 now only £12.00!! To upgrade old version of INKWELL send £4.00 + Cartridge. Prices includes p&p and comprehensive manual. Send Cheque/P.O. to:

PALANTIR PRODUCTS
78 Leighton Road, Bedminster, Bristol BS3 1NU

BUSINESS

SPY multi-file editor	**£14.95**
FILE RECOVERY service	**£8/H**
QRAM custom systems ...	**£10.00**
ARCHIVIST database	**£29.95**
CARDFILE database	**£14.95**
MAILFILE database	**£14.95**
LIBRARIAN database	**£19.95**
MAILMERGE the fastest	**£9.95**

Please send SAE for info/reviews
POSTAGE: UK £10, Europe £2, World £4
CREDIT: Access, Visa . . .
CHEQUES: UK, Euro, London Sterling

APPLIED RESEARCH KERNAL

ARK DISTRIBUTION (Tel: 0983 79 496)
Corve Farmhouse, Chale Green
VENTNOR, PO38 2LA, UK

PROBLEMS WITH YOUR QL!

FOR FAST, RELIABLE AND PROFESSIONAL REPAIRS AT COMPETITIVE PRICES

Contact:

P M ENGINEERING

Access
UNIT 8, NEW ROAD, ST IVES, CAMBRIDGESHIRE PE17 4BG
BARCLAYCARD VISA

ST IVES (0480) 61394

QUANTA

The independant QL users group

- ★ monthly newsletter (36/40 pages)
- ★ free advice
- ★ tutors (Archive etc.)
- ★ massive software library (mostly free)
- ★ supports for local groups
- ★ workshops
- ★ printer hotline

Further details from Brian Pain, 24 Oxford St, Stony Stratford, Milton Keynes, MK11 1JU Tel: (0908) 564271

LASER PRINTING At the Microfair

Get your documents printed on our Laser Printer at the ZX Microfair

- ★ Give your software manuals that extra touch of quality
- ★ Think how impressive your CV would look
- ★ Give that new ad. an extra bit of professionalism

QUILL, ABACUS, PD2, FRONT PAGE and (hopefully) DTP files all catered for, even SCREEN DUMPS

We will print them from 3½ disk or microdrive while you wait

Professional advice will be available at all times to cover the more esoteric things you may want to do — such as magnifying print, autoscaling graphics, even merging graphics (eg from Easel) into your QUILL documents

Just turn up on the day, or write for more details to:

TAYLOR MADE SYSTEMS LTD
135 Ellerton Road, Surbiton, Surrey, KT6 7UA
Phone (01) 390-5652

U.P.S. FOR THE QL

The Frequency Precision DC Backup Converts your QL power supply into a low cost Uninterruptible Power Supply. The Backup is inserted between the power supply and the QL to remove virtually any interference or power fluctuation and fill in during power cuts for up to an hour

The Backup now has an added function:

No longer do you need to operate a system reset to stop an incorrect printer instruction, new Backups are fitted with a reset button to override the instruction and save paper, temper and time

Standard version £54

Enchanced version to convert the QL to a battery powered portable £89

All prices include VAT and postage. Sterling Cheques only to:

FREQUENCY PRECISION LTD
Hillsview Aller Rd, Dolton, Devon EX19 8QP
(Tel: 0805 4381)

MICRODRIVE

THE PROGRAMS

1. Giles Todd B **DIY Assembler** £5

Featured in the March to June 1985 issues of *QL User,* this complete two-pass assembler will assemble all 68008 code and support the assembler directives DRG, END, EQU, DC and DS.

---

2. Richard Cross A + O **Mini Monitor** £3

Using approximately 3K of RAM, this utility multi-tasks on your QL, leaving plenty of room for other programs. Commands include dumping registers, memory and ASCII machine code trace, register store, memory move, memory store — byte, word and long — and jumps. *QL User,* October 1985.

---

4. Shergold & Tose B **Golf** £2

With up to 50 courses of varying difficulty, lakes, rivers, bunkers and trees. You decide the power and direction of each stroke, striving for a birdie, eagle or even an albatross. Your scorecard may be saved. *QL User,* May 1985.

---

5. Williams & Holliday A + O **Paladin** £5

Written completely in machine code, this excellent *Space Invaders* game was the basis of our games programming series, started in April 1985.

---

7. Steve Deary B **Pacman** £1

Almost 20 screens of increasing difficulty, including an invisible maze, make it a very versatile rendition of the arcade favourite. *QL User,* March 1985.

---

8. Andy Carmichael B **Family Tree** £3

An Archive program and database for setting-up and displaying large family trees. *QL User,* August 1985.

---

9. James Lucy L **Composer** £3

Completed in *QL User,* October 1985, this QLiberated program will allow you to compose, play and edit music. The program will handle sharps, vary tempo, and specify staccato and legato playing styles.

---

13. S J Ackers S **Touch Type** £4

This program has a 13-lesson course for typing letters, words and phrases, a 700-word vocabulary, an interactive keyboard display and a fingering chart as more than 30K of code. Scores are based on the speed and accuracy of typing. a reduced version was printed in the August 1985 issue.

---

17. Tony Quinn S **CAD QL** £4

CAD design programs are particularly suited to the QL. This version includes rubber-banding and a user-definable symbol library. *QL World,* September 1988.

19. Karl Jeffrey M + B **Starport 2001** £3

Fast machine code action in this version of the *Galaxians* arcade game. *QL World,* November 1986.

---

24. J F Tydeman S **Design 3D** £4

3D screen designs with the minimum of fuss and aggravation. *QL World,* March/April 1987.

---

25. D Carmona B **Stellaris** £4

This is an extensive real-time space adventure game against the computer, including economic simulations, lunar landing and superb graphics. *QL World,* June 1987.

---

29. Peter Etheridge B **Bridge** £4

An excellent version of this popular card game. Features include accurate computer bidding, automatic or manual play, replay hands, correct scoring, save and load positions and more.

---

31. B Otridge **Crossword** £5

Originally a commercial program, this is the perfect aid for crossword fanatics: access by word length to a dictionary of about 12,500 words, to help solve those elusive clues. This program requires two Microdrive cartridges.

---

32. Phillip Sproston B **Advent2** £4

SuperBasic arcade adventure with a humorous slant. A variety of rooms, robots and problems will keep you on your toes. Full instructions included.

---

33. Leslie Fahidy B **Clock** £3

This is a complete version of the clock program, described in the June and July 1987 issues of our QL Education series. an on-screen clock can be used to set or read the time.

---

34. E Bamber **QL Converson/ Calculator** £2

Weights and measures units, conventions and reverse Polish calculation, this utility will convert almost anything to anything. Completely menu-driven, it is very easy to use.

---

35. John Wakefield B **Qwhist** £3

Designed for one player (south) who partners a computer hand (north) against the computerised east and west opponents. *QL World,* August 1987.

---

36. Stanley Sykes B **Mail Merge** £1

This cartridge contains very handy utilities providing a mail merge and labeller for Quill files. Includes a demonstration.

EXCHANGE

READY TO RUN SOFTWARE

KEY							
	B	=	SuperBasic	A + B + O	=	Assembler and Basic Loader and Object Code
	A + O	=	Assembler and Object Code	S	=	Supercharged
	M + B	=	machine code and Basic Loader	L	=	QLiberate

37. P G Ives — B — **The Double** — £4

A large strategy game in which you manage a football team through four league divisions; features buying and selling, team line-up, morale, and so on, through the league and F.A. Cup season. Includes full instructions.

---

38. Leslie Fahidy — B — **Education** — £2

As part of our series of educational programs, this is designed to help teach the solution of simple linear equations. It is aimed specifically at the 11-plus age range.

---

39. J F Tydeman — S — **Design 3D** — £4

A large suite of graphics and filing utilities for the production of 2D and 3D graphics, with instructions in the form of a Quill document. *QL World*, March 1987.

---

40. Santiago Rubio — B — **Roulette** — £3

A Spanish/English version of the traditional gambling game; includes the Leigh Pattern, a system to break the bank. *QL World*, September 1987.

---

41. Leslie Fahidy — B — **Money** — £2

An educational shopping expedition, calculating prices from shopping lists and trying to determine what coins you will receive as change.

---

42. Neil Davidson — A + B + O — **Life** — £2

A machine code version of the classic simulation of a colony of living cells which survive, reproduce or die according to mathematical rules. Quill instructions included.

---

43. Alan Glassbrook — S — **Ian Swinton Qsquidge** — £2

An arcade hunt through an 8x8 grid expandable series of rooms for the nine parts of Squidge's rocket. *QL World*, October 1987.

---

44. David March — B — **Compress** — £2

Utility to compress SuperBasic program files into a more compact form without losing the structure of the program.

---

45. Ronnie Davidson — M + B — **SuperBreakout** — £2

A fast machine code version of the classic wall game where, using a bat and ball, you must try to break through the wall of bricks. Optional double bats and/or balls.

46. Norman Marks — B — **Navigator** — £2

To calculate the distance and direction for travel between longitude and latitude positions on the Earth. The program includes an expandable list of locations. The calculation formulae can be seen from within the program.

---

47. Richard Clements — B — **3D Maze** — £2

Chase round the generated maze, shown in three dimensions, searching for the key to the next level before going through the exit. Extra points can be gained by passing over Point Squares but do not be carried away because it is all against the clock.

---

48. Jason Price — B — **Yahtzee** — £2

The popular dice game. On-screen graphics make the two-player program enjoyable and easy to use. *QL World*, November 1987.

---

50 Jay Lewington — B — **Bank** — £4

A menu-driven program to keep track of a number of bank accounts, including credits and debits, dated standing orders, printed statements and more.

THE ALL-NEW MICRODRIVE EXCHANGE

Microdrive Exchange has always been a popular feature of *Sinclair QL World* and in our constant efforts to improve the magazine we are expanding the Exchange to bring you even more quality programs at budget prices.

To achieve those results we have altered the format of the Exchange. Rather than calculating the number of sectors required by each program and sending the appropriate number of cartridges, we have now made it a one-program, one-cartridge system. So if you would like, say four programs, then regardless of length you will need four cartridges.

There are a number of advantages to the system. First, the service will be much faster, because programs can be copied in advance. Second, rather than having to ensure having the article for documentation we will be able to supply Quill documents on the Microdrive, if needed for future programs.

Finally, for all new programs on the Exchange, rather than just receiving the machine code version, the Supercharged version or whatever, we will be able to supply assembly listings, hex loaders and original Super Basic versions on the same cartridge, so that you can look at and amend programs.

Naturally this service will require the transfer of more than the usual number of Microdrives but bear in mind that the number of Microdrives you send will be returned with the software. We have reduced the price of Microdrives to £2 per cartridge.

With the new system, we have started to include programs which have not necessarily been featured in the magazine, either because they were too long or because we already had too many listings. Consequently we are now looking for quality programs of any length to feature in Microdrive Exchange. If you have any programs which you feel are good enough please send them for review.

See over page for order form

51. A Didcock | **B** | **Perspective** | **£1**

Space is big. This program aims to prove it, with a graphical guided tour of the earth, the solar system, neighbouring suns, galaxy and the whole of creation.

---

52. Simon Quinn | **M + B** | **Space Pods** | **£3**

A machine code arcade game. Your lone ship must protect six central energy pods against marauding aliens. *QL World,* December 1987.

---

53. S M Walker | **B** | **Graphic Writer** | **£2**

A graphic design program. In addition to the usual design commands, your picture can be saved as a series of SuperBasic commands for use in programs. *QL World,* December 1987.

---

54. L Miles | **M + B** | **Zapman** | **£3**

This fast-action, machine code game is of the classic *Pacman* genre. Variable skill levels and a wide variety of maze formats will keep your interest high.

---

55. Alan Pemberton | **B** | **Adventure Playtime** | **£3**

An extensive adventure where you must complete tasks for the inhabitants of a strange and unusual land. A Quill document gives details of the possible commands and some help in the form of a series of coded messages.

56. Paul Mckinnon | **M** | **Space Invaders** | **£3**

A very fast, very challenging version of one of the best-known arcade games. Includes Quill instructions, ugly descending aliens and protective shields.

---

57. Timo Salmi | **B** | **Spelled** | **£3**

A complete spelling checker. The system works on Quill—lis files, checking them against its dictionary of more than 7,500 words. The dictionary can be expanded automatically as new words are found. This program requires a 512K expansion and occupies two Microdrive cartridges. Quill instructions are included.

---

58. Nigel Ford | **B** | **Radar** | **£2**

As Control, you must monitor a radar, watching the skies, acknowledging aircraft, scrambling jets to intercept UFOs, lining your sights and shooting down enemy aircraft.

---

59. Geoffrey Evelyn | **B** | **Dungeons** | **£4**

As Wizard, Mega-Hero, Super-Hero or Elf, you must explore the *Dungeons,* fighting monsters and collecting treasure in this expansive one- to four-player game. Requires two Microdrive cartridges.

---

60. William Henderson | **B** | **Speed Mind** | **£3**

Based on the old Master Mind game played with coloured pegs, the game gives you 12 attempts at breaking the code, and times your guesses. QL World January 1988.

ORDER FORM

No. of programs required ☐
No. of drives required ☐
No. of drives sent ☐
Program ID Numbers ☐☐☐☐☐☐☐☐☐☐

QL GOLD CARD NUMBER (IF ANY) ☐☐☐☐☐☐

Total cost of programs	£ .....
Drive cost (£2 each)	£ .....
Sub-total	£ .....
Postage & packing	£0.75
+ 15% VAT	£ .....
TOTAL	£ .....
−10% DISCOUNT FOR QL GOLD CARD HOLDER	£ .....
TOTAL TO BE SENT	£ .....

Name_____

Address_____

Please copy on to Microdrive the programs above which I have indicated by their ID numbers. I enclose a cheque/PO to the value of £..... made payable to *Sinclair QL World.* I understand that *Sinclair QL World* undertakes to supply only these programs – copied onto Microdrive – and accepts no liability for their operation as defined by the author. Neither can *Sinclair QL World* supply additional information about any of the programs other than that originally printed or supplied. Any article reprints must be ordered and paid for separately at £2 each inclusive of post and packing – £3 overseas.

Please send order form to: Mike McKenzie, PO Box 74, Tonbridge, TN12 6DW. Tel: 089 283 4783.

TRANSFORM LTD. Computer Accessories

MAIL LIST £24.95

Allows you to retrieve names & addresses from within ARCHIVE. Other features include single key functions, prints address labels, exports files to Quill also compatible with our stock control.

STOCK CONTROL £24.95

Keeps records of all stock items including retail price, trade price, minimum order level, items on order & many other features.

QL APPOINTMENT DIARY £24.95

Records appointments dates & times, can be used as diary, dentist, doctors, hairdressers, service engineers. Program allows 26 users, up to 40 appointments per day plus many other features.

QSPELL £24.95

Spelling checker for Quill supplied with 25000 words, checks an A4 page in 24 secs.

PAYROLL £63.25

Calculates weekly, monthly or 4 weekly payroll full tax calculations, coin analysis & payment rounding.

ARCHIVE

Our team of programmers are able to write programs to your requirements, phone for further details.

QL KEY DEFINE £9.95

For those who use Quill or SUPERbasic this program is a must allowing you to define up to 2k on each key.

QL CALC £9.95

Enables you to press CTRL & any other key to give you a full calculator. Compatible with Quill, Archive, Abacus & Easel. Many other features.

QL SWITCH £14.95

Allows users with extra memory to run Quill, Archive, Abacus & Easel at the same time or two Archive programs & Quill.

RAM DISC £14.95

Enables users with extra memory to set up a ram disc; programs can then be instantly saved & re-loaded. A printer spooler is also included to allow you to print whilst using other programs.

TOOL KIT £9.95

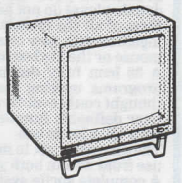
This program will copy all or selected files, delete one or selected files, display file to screen, change file name, format & print multiple copies of Quill files.

INVOICING £49.95

Sales day book, sales ledger & audit trail, for disk only, holds up to 4500 invoices with names & addresses, invoice address, plus multiple delivery addresses, links with stock control, retains invoices, also available Three part paper printed for invoicing.

New

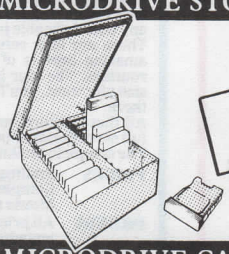
MONITORS



£86.25

Philips 7502 ..... £86.25
Please add **£5.75** for delivery.

MICRODRIVE STORAGE BOX



£4.95

MICRODRIVE CARTRIDGES

Single £1.75
Box + 10 cartridges £22.45
Box + 20 cartridges £39.95
Please add **£1.00** p&p on boxes.

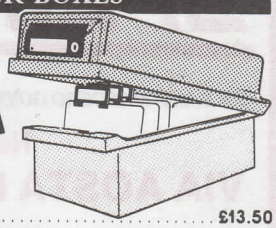
PRINTER PAPER

2000 sheets continuous paper £13.00
700 sheets 3 part paper £24.40
1000 continuous labels £6.65
Please add **£3.75** p&p on paper **£1.30** on labels.

QL CHESS £17.95

DISK BOXES

£13.50



3½" box holds 40 ..... £13.50
3½" jumbo box holds 80 ..... £17.50
Please add **£1.30** p&p for disks & boxes.

ACCESSORIES

Monochrome monitor lead £5.75
RS 232 lead £11.50
Centronics interface £19.50

DISK DRIVES & INTERFACES

Miracle System Trump Card £179.00
Cumana disk interface £79.90
Sandy disk interface £215.00
Single 720k disk drive £115.00
Dual 1440k disk drive £184.00
Please add **£5.75** p&p.

MEMORY EXTENSIONS

512K £99.00

ORGANISER

Psion organiser XP £139.50
RS 232 link £47.95
64k data pack £79.95

QL to ORGANISER **£39.95**
QL to PC **£29.95**

XCHANGE £295.00

Xchange is available from Transford Ltd. to run on the following: IBM PC/XT/AT & IBM compatibles, APRICOT PC, F series, XEN, ICL DRS20, DRS300, OPD, LOGICA KENNET, MERLIN 4000, VICTOR SEREIUS, TORCH GRADUATE & BT TONTO. We offer on site training & database applications to suit your requirements. Network upgrades enables XCHANGE to run up to 10 workstations. Evaluation packs available for **£10.00**.

PC FOUR £79.95

A cut-down version of Xchange as supplied on the QL but with the added facility of 65,535 entries in Archive, 999 lines in Abacus & mail merge plus key define built into Quill.

PSION XCHANGE

ARCHIVE DATABASE
Multifile relational database. Only memory restricts the number of files in use at one time. Variable length records with a maximum of 255 characters per field, 255 fields per record, 65535 records per file. Command language allows the user to define procedures using a powerful editor. Flexible multifile indices provide fast access and a form designer for screen and printer input and output.

QUILL WORDPROCESSOR
Text and page formatting, underlining, bold, italic, superscript, subscript, justification, tabs, line spacing, page size, page headers, footers and numbering. On screen editing, fast page access, cut and paste, block copy, block move, insert/overwrite modes, search and find, search and replace, key define and mail merge. Document size only restricted by disk capacity, background printing allows the user to print documents while working on others.

£295 INC. VAT

EASEL BUSINESS GRAPHICS
3D Business graphics including bar, line and pie charts, no limit to the number of values or numbers or sets of figures. Automatic rescaling, user define colours, text annotation of graphs at any pixel point. Intelligent evaluation of data formulae or manipulation of existing data. Images stored in internal format; monitor resolution is the only limit on final image quality. Accepts data from spreadsheet, database, etc.

ABACUS SPREADSHEET
Expansive spreadsheet with 999 rows, 255 columns, virtual memory system buffers to disk only when full, facilitating very large spreadsheets. Efficiency memory used only for full cells, each cell only uses 14 bytes. Variable width cells, block copy, block move, insert, delete columns and rows, merge and consolidation of data from different spreadsheets. Accurate to 15 significant figures, full range of mathematical, scientific, date, average, ASCII and DIF conversion.

PC FOUR £79.35

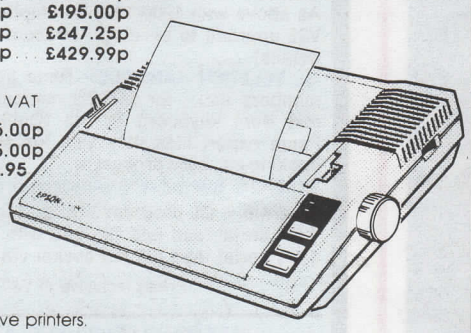
PRINTERS

LX800 215·00 + vat

DOT MATRIX	Ex VAT	Inc VAT
BROTHER M1109	£185.00p	£212.75p
CITIZEN 120D	£170.00p	£195.00p
EPSON LX800	£215.00p	£247.25p
EPSON FX800	£373.91p	£429.99p

DAISYWHEEL	Ex VAT	Inc VAT
BROTHER HR20	£386.96p	£445.00p
BROTHER HR25XL	£604.35p	£695.00p
NATIONAL	£273.00p	£313.95
PANASONIC KXP3131		

ACCESSORIES
LX tractor feed £20.70



We also stock ribbons for the above printers.
Please add **£5.75** for delivery of printers & monitors.

Access

TRANSFORM LTD (DEPT. QL) 01-658 6350
Mail order only. 24 West Oak, Beckenham, Kent. BR3 2EZ

VISA

SPEM

S.P.E.M.DI MASOERO GUIDO

STUDIO PRODUZIONI
ELETTRONICHE MASOERO
PROGETTI DI CIRCUITI
ELETTRONICI
REALIZZAZIONE PROTOTIPI
INGEGNERIZZAZIONE
PRODUZIONE
COLLAUDO PROGETTI
FORNITURA CIRCUITI STAMPATI

New address

VIA AOSTA 86 10154 TORINO

QL SYSTEM/2 SPEM

This new QL in an aluminium cabinet has a PC AT style keyboard, dual internal floppy, and internal power supply to save your money

Inside is the QL main board, your memory expansion, your floppy disk and interface. 4 slots are available for expansion — units as QEPROM for EPROM programs (192kB total) and floppy interface

Space for switching power supply and hard disk. External keyboard with 84 key, complete numeric pad, 10 function keys, flat cable 30'' long, inserted in QL board

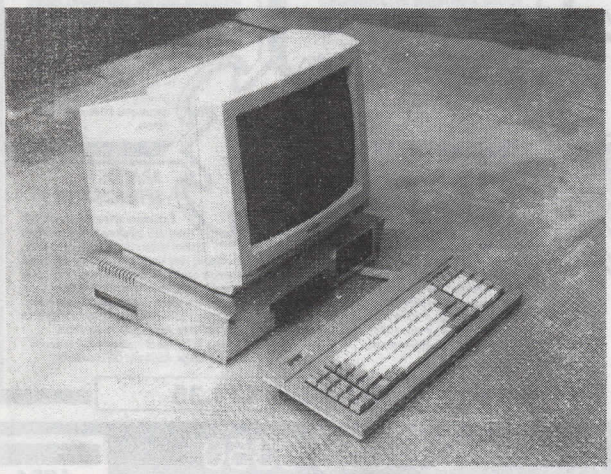
Available now directly from SPEM Italy or from the best dealers in England

Kit with cabinet, Bus extension for 4 slots, cable, screw, switch, extension cable for MDV and instructions

QL systems/2 mounting kit	only **£99.90**
Keyboard QL complete	only **£99.90**
Spem video digitalizer	only **£130.00**
Internal memory for 640k	only **£85.00**
Floppy disk interface	only **£59.90**
QEPROM for 3-4 EPROM 27512	only **£34.90**
QLrom for Plug external EPROM 27128	only **£4.90**
Mandelbrot Quickly for expanded QL	only **£17.90**
QCS CAD for Professional PCB	only **£99.90**

Please write for catalogue and dealers price

Please use postal orders only, not credit cards, in Italy



MICE

THE COMPATIBLE MOUSE SYSTEM

Yes thanks to some thoughtful design and some clever software, this mouse kills those compatibility problems that plague the others on the market and cause them to rely on expensive specially written software. Ours does not!! The smiling mouse is already compatible with literally hundreds of programs, including many of the popular commercial ones and even the ever fussy Psion ones work with it!!
The mouse simply plugs into the ROM port on the back of your QL and the software, which gives full control over the mouse with just a few simple basic commands, can be provided on either microdrive cartridge or 3.5'' disk. Or you can even buy it with one of our bundles — the choice is yours!!

TOOLS

THE ULTIMATE BASIC EXTENSION

No toolkit has ever before ventured so far to bring out the super computer abilities of your QL. There now follows a brief description, if you want more details please do not hesitate to write.
First of all the toolkit contains all of the mouse commands that are detailed above together with new one that provide on screen pointers controllable from either the mouse or the keyboard.
A 32 Icon fully definable environment is provided to be from within your own programs making them simple to use and even more user friendly than you thought could ever be possible.
User definable function keys are at last brought to your QL, these can help make your QL a joy to use.
The character set is made fully definable and simple routines are provided to allow use from within both your own and other peoples programs.
A complete sprite system is provided giving you 32 super smooth fully controllable sprites each of which may have up to 16 frames of animation and they can even outstrip the QL when it comes to speed!!
There are also lots of new graphics commands — many of them are duplicates of the existing graphics commands in all but one important aspect — patterns, instead of them drawing in solid colours or stipples, the new ones draw in one of 32 user definable patterns. There's even a paint command that will fill any shape with any user definable pattern!
There are four screens dump routines provided in the toolkit. One of the most amazing aspects of this toolkit are the new desk top publisher style character routines. The four basic sizes of character each of which may be expanded to any size you want, you'll find no rough edges on our characters, unless you want them there.
All these features are easly used from basic or where appropriate machine code. A full set of designer programs are included as is full documentation.
The complete toolkit is available on MOV or 3.5'' disk.

PRICES

Smiling Mouse	£40	Mouse and Eye-Q	£65
Complete Toolkit II	£30	Mouse and Office Junior	£60
Mouse and Toolkit	£60		

ORDERS All prices included UK postage — Please add £1 for Europe or £2 for anywhere else in the World

U.S. Distributor: **Quantum Computing, Box 1280, Dover, New Jersey 07801**

Please send your orders and enquiries to:

Smiling Software

8 Croxton Close, Marple, Stockport SK6 7RQ
Tel: 061 427 5254

Tony Firshman Services

COMPUTER CLEANER Tried and tested mains filters. Full spec – LCR filters + spike suppression. 40 to 80 db noise reduction. 130 joule cut in < 10ns for each spike filter.
"A test rig supports it's claims to being an effective and efficient design. Response time to mains variations is somewhat better than advertised" – *Ron Massey QL World (Sep 87)*

1-way (5a - LCR + one spike filter)	**£14**
3-way (5a - LCR + 3 spike filters (L/N, L/E, N/E)	**£18**
4-way (13a - spec as 3-way + 1.5m lead)	**£24**

QuaLsoft QL TERMINAL EMULATOR viewdata/ASCII/VT52, phonebook with autodial/logon, XMODEM (CRC or checksum), all on line help and commands via pulldown windows, configurable for Astracom/Tandata/Hayes and any other modem, full viewdata pixel editor, full multitasking (QRAM hotkeyable), support on Peacenet. Version now available for Miracle Modem & Modaptor.

Many many more features	**£30**
ASTRACOM intelligent modem with text status messages. V21/23 Hayes protocol. parallel printer port (5k buffer), with QL ser2 lead (BT approved)	**£175**
As above with 1200/1200 full duplex (v22) (BT approved)	**£290**
V22 upgrade to existing Astracoms (converts to Hayes – ring for details)	**£115**

QL TELEPEN BARCODER Read and write ASCII barcodes (text, numbers etc) - for EPSON compatible printers. Will print ASCII text from keyboard or file (Quill print files, Basic programs, Psion export files etc). Use for archiving, stock control, library booking etc. 8085 processor.

TELEPEN Barcoder (renovated professional model - £500) QL program + QL program	**£85**
1.5m serial lead (std QL lead with 25 pin plug via ser2)	**£9.50**
1.5m serial lead (25 pin socket via ser1)	**£9.50**

Prices inclusive of VAT, post and packing

VISA

★ SEE US ON 6 FEBRUARY AT THE ZX MICROFAIR — ON LINE DEMONSTRATIONS OF MODEM ★

12 Bouverie Place, London W2 1RB. Tel: 01-724 9053
Telex: 265451 (quoting BT Gold 72:MAG90645)

MPC SOFTWARE

SOFTWARE

GAMES

Arkanoid	£14.00
Chess	£17.00
Deathstrike	£13.00
Eldersoft 3 Pack	£15.00
Flight	£17.00
Lost Pharaoh	£13.00
Scrabble	£13.00
Strip Poker	£13.50
Tank Busters	£12.00
Vroom	£13.50
Wanderer	£17.00
Macro Assembler (GST)	£27.00

BUSINESS

Cash Trader (mdv-disc)	£40.00
Concept 3D	£28.00
Front Page	£21.00
Project Planner	£25.00
Spellbound (disc-mdv)	£29.00
Taskmaster	£23.00
Qwriter II	£17.00

LANGUAGES

Assembler Workbench	£36.00
Assembler (GST)	£20.00
Macro Assembler (GST)	£32.00

UTILITIES

Bag of Tricks 1 & 2	£10.00
Cartridge Doctor	£13.50
Copier	£ 7.00
Font Designer	£ 5.00
Graphic Toolkit	£13.00
QFlash & Toolkit	£19.00
QFlash ROM	£23.00
QL Paint (GraphicQL+)	£18.00
RAM Disc	£14.00
Shrink	£ 5.00
QL Peinire	£11.00

We have a large range of reduced priced software

TELEPHONE
for further details

BOOKS

QL Book of Games	£ 4.00
Sinclair QL Adventures	£ 2.50
Artificial Intelligence on the Sinclair QL	£ 3.00
Quill, Archive, Easel & Abacus on the QL	£ 4.00
Inside the Sinclair QL (Hardware)	£ 5.00
Desktop Computing with the Sinclair QL	£ 3.00
Word Processing with the Sinclair QL	£ 3.00
Database Management on the Sinclair QL	£ 3.00
Advanced Programming with the Sinclair QL	£ 4.00
Making the most of the Sinclair QL	£ 4.00
Using Graphics on the Sinclair QL	£ 4.00
Introduction to Superbasic on the Sinclair QL	£ 3.00
Introducing the Sinclair QL	£ 3.50
Profiting from the QL (Abacus)	£ 3.50
QL Computing	£ 3.00
Quatum Theory	£ 4.00
Assembly Language Programming on the Sinclair QL	£ 7.95
QL Service Manual	£19.95
Hackers Handbook	£ 4.00
Creating Adventure Programmes on your Computer	£ 2.50
QL Handbook	£ 5.95
QL Games Compedium	£ 5.95
Exploring Artificial Intelligence on the QL	£ 3.50
Computer Art & Graphics	£ 4.00
Xenix Users Guide	£ 5.00
How to computerise your business successfully	£ 3.00
Big Red Book of C	£ 7.00
66000 Hardware & Software	£ 9.00
66000 User Guide	£ 6.00
Archive Users Reference Manual	£ 14.00

QL Computers

New: £140.00

Special Offers

Tankbusters & Deathstrike	£20.00
Macro Assembler, QDOS Companion & Assembly Language Book	£35.00
7 Hutchinson Books (Worth over £50.00)	£10.00
Jabber & Quboids	£15.00

While stocks last only.

TECHNI QL

Techni QL is a two dimensional CAD package available for all general and engineering applications. It allows the user to create accurate and finely detailed plans, diagrams and designs. These can then be printed out to any width on any epsom or eprom compatible printers.

FEATURES INCLUDED:

Fast multi width printer output
Menu or mouse driven
Windows any drawings much larger than the screen
Multiple zooms (in or out)
Compressed storage of designs
Two screen modes
Up to 75 cells can be created
Cells can be edited, mirrored, rotated, scaled and positioned accurately on top of other cells
Grid snap
Up to eight grids per design
Text can be mixed freely
Relocatable code (compatible with disks/extra ram)

SUITABLE FOR:

Flow charting, electrical design, mechanical drawing, letterheads/logos, PERT charts, architectural drawing and much more.

£40.00

7 QL Books for only £10.00

Introduction to Superbasic on the Sinclair QL
Make the most of the QL
Database Management on the QL
Introducing the Sinclair QL
Profiting from the QL
Word Processing on the QL
Desk Top Computing with the Sinclair QL

RRP over **£50.00**

Postage UK – Free, Europe – £8.00,
R.O.T.W. – Write

HARDWARE

DISC PRODUCTS

Disc Interface	£ 85.00
Interface & Single Drive	£185.00
Interface & Dual Drive	£275.00
Trump Card & Dual Drive	£345.00
90 x 3.5 Lockable Storage Box	£ 18.00
3.5" Disc Head Cleaner	£ 8.00

MEMORY PRODUCTS

Miracle Expanderam	£ 75.00
QFlash RAM Disc	£ 18.00
QFlash RAM Disc (ROM)	£ 25.00
Trump Card	£185.00
Memory 'Shrink' Program	£ 5.00

PERIPHERALS

Centronics Printer Interface	£20.00
Serial Cable	£ 8.00
Keyboard Membrane	£ 8.00
Microdrive Cartridges	£ 1.80
4 Microdrives in Wallet	£ 7.60
Joystick Adapter	£ 4.50
Miracle Modern	£46.00
Schon Keyboard	£54.00
Linnet Modern & Software	£180
Sandy Keyboard	£88

POSTAGE TERMS

UK: FREE on orders over £10.00 — £1.00 on order under £10.00
Europe: £1.00 plus £1.00 per book – Outside Europe write

PRINTERS

	RRP	OUR
CITIZEN 120D	£240.00	£200.00
CITIZEN LSP10	£320.00	£220.00
CITIZEN LSP100	£400.00	£280.00
PANASONIC KXP1081	£300.00	£260.00

2 YEAR GUARANTEE on all CITIZEN PRINTERS

PLEASE PHONE FOR DETAILS ON OTHER PRINTERS

QL spare & repairs *phone for more details*

MPC Software 72 Julian Road, West Bridgeford, Nottingham, NG2 5AN
Telephone: (0602) 820106/455114

Mail Order only

STRONG COMPUTER SYSTEMS

BRYN COTTAGE, PENIEL, CARMARTHEN, DYFED SA32 7DJ. TEL: 0267-231246

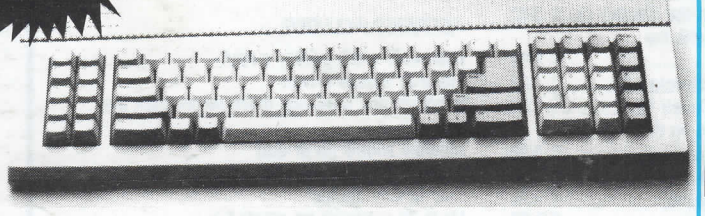
VISA

ALL PRICES INCLUDE VAT & CARR.

SUPERIOR REPLACEMENT QL KEYBOARD

£99

THIS HAS BEEN DESIGNED FOR THE FUTURA MEETING THE HIGHEST SPECIFICATIONS



FEATURES

- ERGONOMIC DESIGN
- NUMERIC KEYPAD
- FULL TRAVEL KEYS
- 10 FUNCTION KEYS
- ANTI BOUNCE
- EASY FITTING

LOWEST PRICES ON QL DISK SYSTEMS

TRUMPCARD + QRAM	£199
TRUMPCARD + QRAM + DUAL 3.5"	
NEC DRIVES + 10 DS/DD DISKS	£379
SUPERBOARD OK INC. TK1 & TK2	£ 89
SQB + SINGLE DRIVE + 10 DISKS	£199
MOUSE FOR SUPERQBOARD	£ 39
DUAL NEC DRIVES + 10 DISKS	£189
SINGLE NEC DRIVE + 10 DISKS	£119
NEC MECHANISM	£ 79

BEST PRINTER BUY

SEIKOSHA SL80AI LQ PRINTER £379

FEATURES

- 24 PIN HEAD GIVING LETTER QUALITY
- PERFECT LETTER QUALITY 50 CPS
- DRAFT QUALITY 150 CPS
- INCLUDES PARALLEL INTERFACE

SPECIAL OFFER: SEIKOSHA SP180A PRINTER INC PARALELL INTERFACE	£169
THE ASTRACOM 1000 MULTISTANDARD INTELLIGENT MODEM	£198
Complete with Communicaions Software • • BT APPROVED • •	
QUALITY PRINTER STAND Suitable for any 80 Col Printer **ONLY**	£ 39
SET OF 6 BOOKS	£ 19
128K QL COMPUTER	£149
10 DS/DD 3.5" DISKS IN CASE	£ 16
MCS MULTIROM	£59
640K QL COMPUTER	£239
SCHON KEYBOARD	£ 57
SPECIAL OFFER: 20 3.5" DISKS + FREE STORAGE BOX FOR 40 DISKS	£29

QL REPAIRS 7 DAY SERVICE	£28
EMERGENCY SERVICE	£38
QL KEYBOARD MEMBRANE	£ 6
ULA ZX8301	£10
ULA ZX8302	£10
2 AMP 5 VOLT REGULATOR	£ 4
68008 CPU	£25
PLEASE CALL FOR OTHER SPARES	

• NEW • QTYPE SPELLING CHECKER COMPATIBLE WITH QRAM	£ 29
• NEW • QPTR POINTER INTERFACE	£ 29

PRINTER PRICES INCLUDE MIRACLE SYSTEMS INTERFACE

CANON PW1080	£289
SEIKOSHA 1300AI 300CPS (colour option £100 extra)	£399
DAISYWHEEL MP26 (26 CPS) QUME COMPATIBLE	£299
2000 Sheets Fanfold Paper Micro Perf	£ 19
2000 Sheets Fanfold Paper (Supplied with printer)	£ 16
MIRACLE SYSTEMS PARALELL INTERFACE	£ 20

ACCESSORIES

3250 WATT MAINS FILTER	£ 36
MIRACLE SYSTEMS MODAPTOR	£ 39
MICROSTICK JOYSTICK WITH ADAPTOR	£ 16
20 CARTRIDGES WITH TRANSFORM BOX	£ 40
10 CARTRIDGES WITH TRANSFORM BOX	£ 23
4 Mircrodrive Cartridges £8	Transform Box £ 5
Joystick Adaptor £5	Para Cable for SQB £10
Serial Printer Cable £8	10 DS/DD 5.25" Disks £12

MONITORS (Cables Included)

Microvitic Cub 1451/DQ3 Colour	£249
Microvitic Cub 1451/DQT3 with Swivel Stand	£269
Swivel Stand for Microvitic	£ 25
Phillips BM7502 20MHZ Green (RECOMMENDED FOR THE QL)	£ 99

RIBBONS

BROTHER M1009	£5	MT80 or Shinwa	£ 6
QUEN DATA	£6	SP1000A (Sinclair)	£ 7
TAXAN/CANON	£8	EPSON RX/MX/FX	£ 6
EPSON LX80	£5	CITIZEN 120D	£ 6

Software

BUSINESS

INVESTMENT MONITOR	£19
FRONT PAGE	£22
FRONT PAGE EXTRA 2	£39
TALENT TECHNIQL	£44
CONCEPT 3D CAD	£34
RUBICON VIEWPOINT CART/DISK	£19
DIGITAL EYE Q	£24
QDRAW	£14
SIGN DESIGNER	£19
SPEEDSCREEN	£20
PRO ASTROLOGER CART/DISK	£49
PRO ASTOLOGER + ASTONOMER	£59
QL SERVICE MANUAL	£19
DESK TOP PUBLISHER CART/DISK	£69

LEISURE

TALENT WEST	£ 12
TALENT ZKUL	£ 12
TALENT COSMOS	£ 12
TALENT THE LOST PHAROH	£ 13
TALENT JUNGLE EDDI	£ 13
TALENT NEMESIS	£ 13
TALENT OXFORD TRIVIA	£ 16
TALENT STRIP POKER	£ 13
DIGITAL SUPERBACKGAMMON	£ 11
DIGITAL BLOCKLANDS	£ 9
TALENT HOVERZONE	£ 14

LANGUAGES

METACOMCO ASSEMBLER	£ 29
METACOMCO BCPL	£ 49
METACOMCO LISP	£ 49
METACOMCO PASCAL	£ 69
METACOMCO 'C'	£ 79
PRO FORTRAN	£ 89
PRO PASCAL	£ 89
DIGITAL TURBO	£ 89
TALENT WORKBENCH	£ 19
QL LIBERATOR	£ 59
FORTH + REVERSI	£ 35

BRIDGE PLAYER II	£ 17
WAR IN THE EAST COMPLETE	£ 39
WAR IN THE EAST (SCEN. 1)	£ 20
WAR IN THE EAST (SCEN. 2 OR 3)	£ 13
PSION CHESS	£ 16
PSION MATCHPOINT	£ 12
RUBICON DRAGONHOLD	£ 14
LEISURE GENIUS SCRABBLE	£ 12
HYPERDRIVE	£ 12
DIGITAL DROIDZONE	£ 9
THE TALISMAN (NEW ADVENTURE)	£19
TALENT DEATHSTRIKE	£ 14

UTILITIES

DIGITAL MEDIA MANAGER	£35
THE EDITOR ON CART (128K VER.)	£24
THE EDITOR ON DISK (640 VER.)	£39
TALENT TECHNIKIT	£24
QRAM CART/DISK	£29
QTYP SPELLING CHECKER	£29
DISK & PRINT SPOOLER	£ 9
TALENT SIDEWAYS	£19
DIGITAL SPRITE GENERATOR	£29
LOCKSMITH	£12
4 MATTER	£12
QMON MONITOR/DEBUGGER	£18
TALENT CARTRIDGE DOCTOR	£13
TASKMASTER	£25

TALENT HORRODAY	£14
TALENT FARMER	£14
STEVE DAVIS SNOOKER	£ 12
SELLASOFT TANKBUSTERS	£ 14
TALENT HOVERZONE	£ 14
STONE RAIDER II	£ 13
SQUADRONS	£ 13
TOUCH TYPIST	£ 12
DATALINK 3D SLIME	£ 11
HEART OF GERN (NEW ADVENTURE)	£ 15
DIGITAL SUPER ASTROLOGER	£ 22
TALENT TYPE 22 (TACTICAL)	£ 17

SEE US AT THE ZX MICROFAIR ON FEB. 6

EXPORT AND TRADE ENQUIRIES PLEASE CALL.